

Revision of the Genus *Pandanus* Stickman. Part 35 Additional *Pandanus* Species from New Guinea¹

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NEW GUINEA IS RICH in the species of *Pandanus*. The present paper adds to the species known from that area. These studies were supported by grants from the National Science Foundation.

SECTION *Acrostigma*

Pandanus acicularis sp. nov. (sect. *Acrostigma*)

Fig. 300

DIAGNOSIS HOLOTYPE: Frutex vel arbor 3-4.5 m alta, foliis licet 1 m vel plus longis proxima basem 7-8 cm latis in medio 5.3 cm latis crassiter coriaceis supra clariter viridibus infra pallidioribus U-sulcatis 2-plicatis in sectione mediali cum circa 68 nervis parallelis secundariis in quoque demidio (licet 68 in puncto 30 cm ex apice cum 64 nervis in puncto 16 cm ex basi cum 72) nervis tertiis transversis ad basem elevatis et prominentibus et reticulis breviter oblongis formantibus lamina in apice crassiter trigono subulato deminuenti eo in puncto circa 10 cm ex apice 20 mm lato basi inermi pallida sed ex 8 cm marginibus cum aculeis 3-4.5 mm longis 3-8 mm separatis crassiter subulatis infimo subrecurvato alteris adscendentibus pallidis, midnervo infra ex 7 cm cum aculeis 3-4 mm longis 5-11 mm separatis recurvatis crassiter subulatis pallidis basi conica, in sectione mediali marginibus cum aculeis 1-2 mm longis 1-2.5 mm separatis crassiter subulatis subarcuatis adscendentibus pallidis, midnervo infra cum aculeis 0.5-1 mm longis 0.5-2 mm separatis arcuatis subulatis adscendentibus pallidis, apice incognito sed circa apicem plicis supra serrulatis, syncarpio solitario "sessili rubro 1.5 kgm. pondito" ex bracteis pluribus 7 cm longis ovatis sustento, nucleo 4 cm longo ovoideo, drupis

6.5 cm longis 2.5 mm latis et crassis linearibus prismaticis 6-angulosis, pileo 15 mm longo tuberculoso valde 5-6-anguloso, stylo 13-15 mm longo graciliter subulato rigido proxime inclinato, stigmatibus 7-8 mm longo lineari nigro non ad apicem extento, endocarpio subbasali oblanceoloideo truncato lateribus 0.1 mm crassis cartilagineis pallido, semine 11-12 mm longo, mesocarpio apicali denso cum fibris pluribus validis et parenchyma, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Shrub or tree 3-4.5 m tall; leaves probably more than 1 m long, 7-8 cm wide near the base, 5.3 cm at the middle, thick coriaceous, above bright green, below slightly paler, U-sulcate, 2-pleated, at midsection with about 68 parallel secondary veins in each half (this number deduced since at 30 cm from the apex there are 64, while at 16 cm up from the base there are 72), tertiary crossveins raised and prominent towards the base, forming short oblong meshes, blade tapering to a thick, trigonous, subulate apex, this at the point about 10 cm down 20 mm wide, the base unarmed, pale, beginning at 8 cm up the margins with prickles 3-4.5 mm long, 3-8 mm apart, stout subulate, the lowest slightly recurving, the next ones ascending, pale; the midrib below beginning at 7 cm up with prickles 3-4 mm long, 5-11 mm apart, stout subulate, recurving from a conic base, pale; at midsection the margins with prickles 1-2 mm long, 1-2.5 mm apart, stout subulate, subarcuate, ascending, pale; the nearby midrib below with prickles 0.5-1 mm long, 0.5-2 mm apart, arcuate subulate, ascending, pale; near the apex the pleats above serrulate; syncarp "red, sessile, weighing 3 German lbs.," solitary, subtended by several bracts 7 cm long, ovate; core 4 cm long, ovoid; drupes 6.5 cm long, 2.5 mm wide and thick, linear prismatic, 6-angled; pileus 15 mm long, rough tuberculose, sharply 5-6-ridged; style 13-15 mm long,

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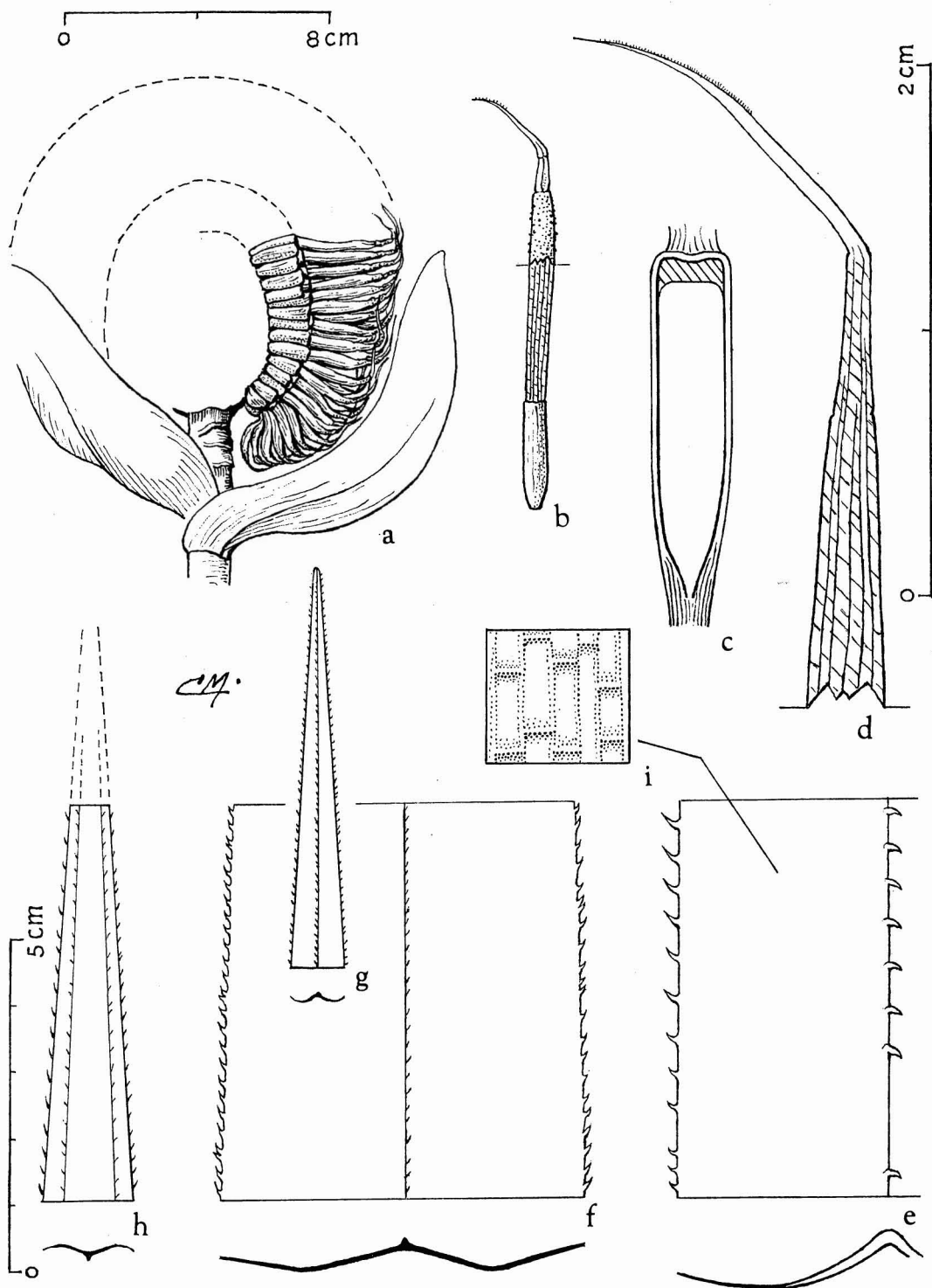


FIG. 300. *Pandanus acicularis* St. John, from holotype. *a*, syncarp, longitudinal section, $\times \frac{1}{2}$; *b*, drupe, lateral view, $\times 1$; *c*, endocarp and seed cavity, longitudinal median section, $\times 4$; *d*, style and stigma, lateral view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$; *h*, leaf apex, upper side, $\times 1$; *i*, leaf base, lower side, with secondary and tertiary veins, $\times 5$.

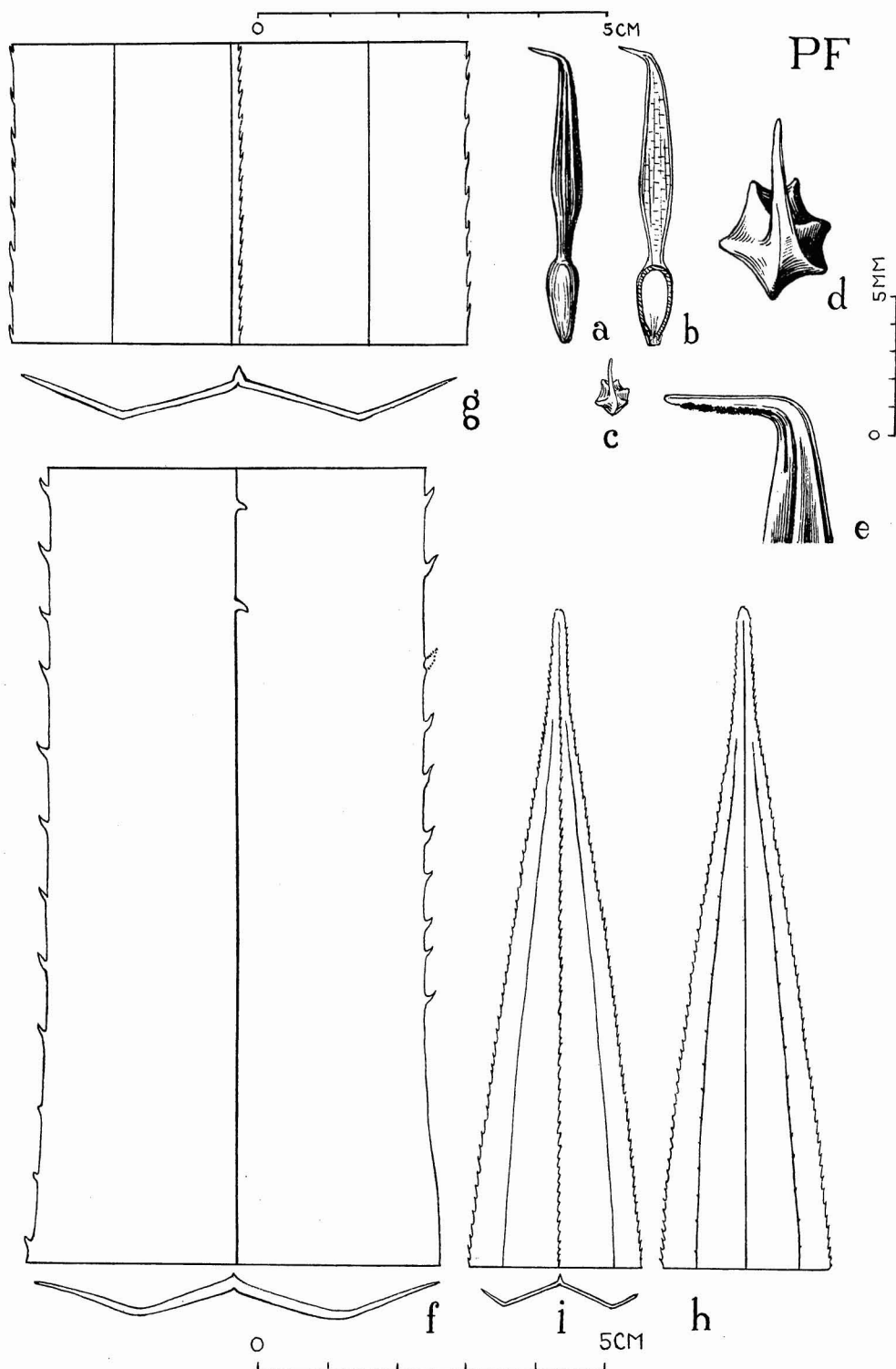


FIG. 301. *Pandanus arcuatus* St. John, from holotype. *a*, drupe, lateral view, $\times 1$; *b*, drupe, longitudinal median section, $\times 1$; *c*, drupe, apical view, $\times 1$; *d*, drupe apex, apical view, $\times 4$; *e*, style and stigma, lateral view, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, upper side, $\times 1$; *i*, leaf apex, lower side, $\times 1$.

slender subulate, rigid, proximally inclined; stigma 7–8 mm long, linear, black, not reaching the tip; endocarp almost basal, oblanceoloid, truncate, the walls 0.1 mm thick, cartilaginous, pale; seed 11–12 mm long; apical mesocarp solid, with several strong fibers and parenchyma; basal mesocarp fibrous and fleshy.

EXPANDED DESCRIPTION: Trunk 10 cm in diameter; prop roots small, up to 45 cm in length; leaves 2.1 m long, deeply channeled; syncarp 18 cm in diameter.

HOLOTYPE: N.E. Neu-Guinea, Morobe Dist., Sattelberg, Boana, marsh by airdrome, 3,100 ft alt, July 30, 1938, *M. S. Clemens* 8,578 (b).

SPECIMENS EXAMINED: New Guinea, Morobe Dist., Boana, 2,500–4,500 ft alt, May–Nov. 1940, *M. S. Clemens* 11,370 (A, UC); Morobe Dist., Oomsis logging area, 23/10/59, *E. E. Henty*, N.G.F. no. 11,581 (κ).

DISCUSSION: *P. acicularis* is a member of the section *Acrostigma*. Its only close relative is an undescribed species from Sorong, Irian Barat (Netherlands New Guinea), represented by *St. John* 26,102.

The new epithet is the Latin adjective *acicularis*, like a needle, and is given with allusion to the shape of the long slender style.

***Pandanus arcuatus* sp. nov. (sect. *Acrostigma*)**

Fig. 301

DIAGNOSIS HOLOTYPE: Arbor 8–10 m alta, caule ramoso vel eramoso, radicibus fulturosis nullis, foliis 2–3.5 m longis in medio 6.5 cm latis ad basem 4.6 cm latis et coriaceis sed in parte $\frac{1}{2}$ ultima chartacea supra viridibus lucidis infra palliditer viridibus et glaucis in sectione mediali cum 59 nervis parallelis secundariis in quoque dimidio nervis tertiis transversis omnino conspicuis et reticulis breviter oblongis vel rhombicis formantibus, lamina plus minusve ligulata sed in parte $\frac{1}{16}$ ultima in apice 2 cm longo valido subulato deminuenti eo in puncto 10 cm ex apice 26 mm lato basi inermi pallida, ex 6–9 cm marginibus cum aculeis 2–2.7 mm longis 5–13 mm separatis arcuatis crasse subulatis adscendentibus pallidis, ex 15 cm midnervo infra cum aculeis 2.5 mm longis 12–20 mm

separatis conici-subulatis divergentibus pallidis, in sectione mediali marginibus cum aculeis 1.5–1.8 mm longis 5–7 mm separatis crassiter subulatis adpresse adscendentibus pallidis, midnervo infra cum aculeis 0.8–1.5 mm longis 2.5–4 mm separatis arcuatis subulatis valde adscendentibus pallidis, in apice subulato marginibus et midnervo infra cum aculeis 0.2–0.5 mm longis 0.3–2 mm separatis arcuatis subulatis compressis adscendentibus pallidis, ad apicem plicis supra cum subulati-serrulis 0.3–0.4 mm longis stramineis, infructescentia cum syncarpio solitario 16 cm vel plus diametro subgloboso, drupis 45–48 mm longis 4–5 mm latis 3–3.5 mm crassis anguste fusiformibus 6-angulosis parte 4/7 supera libera, pileo 22–24 mm alto sublaevi sed punctato et hebeti, stylo 5–6 mm longo aciculari arcuato, stigmati 4–5 mm longo lineari brunneo papilloso, endocarpio basali 9–10 mm longo ellipsoideo osseoso stramineo lateribus lateralibus 0.1 mm crassis intra laevibus lucidis, semine 3–3.5 mm diametro ellipsoideo, mesocarpio apicali ad basem per 7–9 mm molliter carnosum tum cum fibris longitudinalibus paucis et membranis transversis pallidis, mesocarpio basali parvo fibroso et carnosum.

DIAGNOSIS OF HOLOTYPE: Tree 8–10 m tall; stem unbranched or branched; prop roots none; leaves 2–3.5 m long, 6.5 cm wide at the middle, 4.6 cm near the base, coriaceous towards the base, chartaceous in outer half, shiny green above, pale green and glaucous below, at midsection with 59 parallel secondary veins in each half, the tertiary crossveins conspicuous on both sides throughout, forming short oblong or rhombic meshes, blade more or less strap-shaped but in outer $\frac{1}{16}$ narrowing to a 2-cm trigonous stout subulate apex, this at the point 10 cm down 26 mm wide, the base unarmed, pale, beginning at 6–9 cm up the margins with prickles 2–2.7 mm long, 5–13 mm apart, arcuate stout subulate, ascending, pale; beginning at 15 cm the midrib below with prickles 2.5 mm long, 12–20 mm apart, conic-subulate, divergent, pale; at midsection the margins with prickles 1.5–1.8 mm long, 5–7 mm apart, stout subulate, appressed ascending, pale; the midrib below with prickles 0.8–1.5 mm long, 2.5–4 mm apart, arcuate subulate, strongly ascending, pale; on the subulate apex the margins

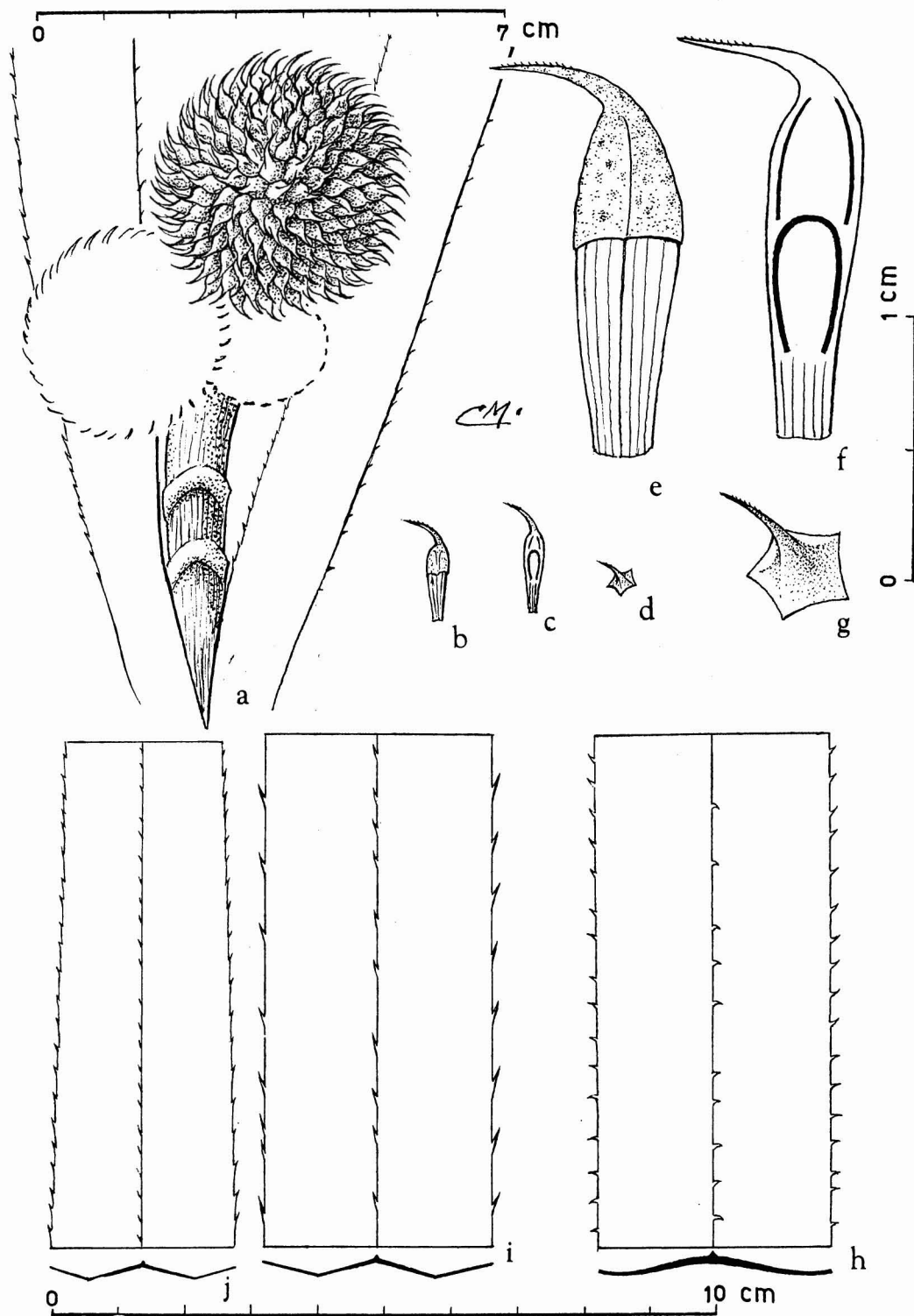


FIG. 302. *Pandanus congregatus* St. John, from holotype. *a*, infructescence, lateral view, $\times 1$; *b*, drupe, lateral view, $\times 1$; *c*, drupe, longitudinal median section, $\times 1$; *d*, drupe, apical view, $\times 1$; *e*, drupe, lateral view, $\times 4$; *f*, drupe, longitudinal median section, $\times 4$; *g*, drupe, apical view, $\times 4$; *h*, leaf base, lower side, $\times 1$; *i*, leaf middle, lower side, $\times 1$; *j*, leaf, beyond the middle, lower side, $\times 1$.

and midrib below with prickles 0.2–0.5 mm long, 0.3–2 mm apart, arcuate subulate, compressed, ascending, pale; towards the apex the two pleats above with serrulations 0.3–0.4 mm long; infructescence with a solitary red syncarp, this 16 cm or more in diameter, subglobose; drupes 45–48 mm long, 4–5 mm wide, 3–3.5 mm thick, narrowly fusiform, 6-angled, upper 4/7 free; pileus 22–24 mm high, narrowly linear-lanceolate, sharply 6-angled, the surface smoothish but punctate and dull; style 5–6 mm long, acicular, arcuate; stigma 4–5 mm long, linear, brown, papillose; endocarp basal, 9–10 mm long, ellipsoid, bony, stramineous, the lateral walls 0.1 mm thick, within smooth, shiny; seed 3–3.5 mm in diameter, ellipsoid; apical mesocarp for 7–9 mm soft, then of a few longitudinal fibers and pale cross membranes; basal mesocarp minute, fibrous, and fleshy.

HOLOTYPE: Papua, Milne Bay Dist., Peria Creek, Kwagira River, common, rain forest, 50 m alt, 18 Aug. 1953, L. J. Brass 24,045 (K). Isotype (A)!

DISCUSSION: *P. arcuatus* is a member of the section *Acrostigma*, as is its closest relative *P. Danckelmannianus* K. Schum. ex Solms ex K. Schum. & Holtr., of Australian New Guinea, a species with the drupes 3.2–3.4 cm long; seed 10 mm long; endocarp enclosing hemispheric mesocarpic cavity above the seed cavity about $\frac{1}{4}$ its size. *P. arcuatus* of Papua has the drupes 4.5–4.8 cm long; seed 8 mm long; and the endocarp enclosing only the seed.

The holotype of *P. Danckelmannianus* has been destroyed. The present writer's interpretation of this species is from Martelli's clastotype (FI), and differs from that of Warburg (1900).

The new epithet is the Latin participle *arcuatus*, curved, and is given with reference to the curved styles.

***Pandanus congregatus* sp. nov. (sect. *Acrostigma*)**

Fig. 302

DIAGNOSIS HOLOTYPI: Frutex prostratus, foliis circa 1.15 m longis in medio basique 3.5 cm latis graciliter subcoriaceis supra viridibus infra pallidioribus U-sulcatis 2-plicatis in

sectione mediali cum 36 nervis parallelis secundariis in quoque dimidio nervis tertiis transversis prominentibus et reticulis quadratis vel breviter oblongis formantibus lamina ligulata sed in parte $\frac{1}{8}$ ultima deminuentibus (apice non preservato) basi inermi licet rosacea, ex 8 cm marginibus cum aculeis 1.3–2 mm longis 3–5 mm separatis graciliter subulatis arcuatis rosaceis inferis reflexis, midnervo infra ex 7 cm cum aculeis 3–5 mm separatis licet 1.5 mm longis et reflexis, in sectione mediali marginibus cum aculeis 0.4–0.8 mm longis 2–4 mm separatis subulatis adpresse adscendentibus pallidis, midnervo proximo infra cum aculeis 0.3–0.5 mm longis 2–3 mm separatis subulatis adscendentibus pallidis ad apicem plicis supra cum serrulis, infrutescentia cum 3 syncarpiis spicatis, pedunculo 40 cm longo 9 mm diametro 3-laterato cum bracteis foliosis pluribus inferiore 85 cm longa 3.2 cm lata, syncarpiis inaequalibus superiore 3.8 cm diametro globoso, mediali reducto et 15 mm diametro, drupis 15–16 mm longis 3–4 mm latis 2–3 mm crassis rubri-aurantiacis anguste ellipsoideis sed apice cum stylo proxime curvato, corpore 5–6-anguloso, pileo 4.5–5 mm alto lanceoloideo anguste anguloso sublaevi, stylo 5 mm longo aciculari omnibus (excepta terminalibus) valde proxime curvatis, stigmatibus 2.5–4 mm longo lineari nigro papilloso non ad apicem attingenti, endocarpio in parte $\frac{1}{8}$ infera cartilagineo pallido lateribus 0.05 mm crassis, semine 5 mm longo ellipsoideo, mesocarpio apicali in lateribus cum fibris fortibus intra cavernoso et cum membranis longitudinalibus, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Prostrate shrub; leaves about 1.15 m long, 3.5 cm wide at middle and base, thin subcoriaceous, clear green above, paler green below, U-sulcate, 2-pleated, at midsection with 36 parallel secondary veins in each half, tertiary crossveins prominent, forming square or short oblong meshes, the blade ligulate, tapering in outer $\frac{1}{8}$, but the apex lost, base unarmed, apparently pink, beginning at 8 cm up the margins with prickles 1.3–2 mm long, 3–5 mm apart, arcuate slender subulate, pink, the lower ones reflexed; the midrib below beginning at 7 cm up with prickles 3–5 mm apart, probably 1.5 mm long and reflexed, but

all of them broken off; at midsection the margins with prickles 0.4–0.8 mm long, 2–4 mm apart, subulate, appressed ascending, pale; the nearby midrib below with prickles 0.3–0.5 mm long, 2–3 mm apart, subulate, ascending, pale; towards the apex the pleats serrulate above; pistillate inflorescence spicate, bearing 3 syncarps; peduncle 40 cm long, 9 mm in diameter, 3-sided, with several leafy bracts, the lowest one 85 cm long, 3.2 cm wide; syncarps unequal, the apical the largest, 3.8 cm in diameter, globose, the middle one reduced, 15 mm in diameter; drupes 15–16 mm long, 3–4 mm wide, 2–3 mm thick, reddish orange, narrowly ellipsoid, ending in a proximally bent style, the body 5–6-angled; pileus 4.5–5 mm high, lanceoloid, sharply angled, nearly smooth; style 5 mm long, acicular, all except the apical ones sharply bent proximally; stigma 2.5–4 mm long, linear, black, papillose, not reaching the tip; endocarp in lower $\frac{1}{3}$, cartilaginous, pale, the walls 0.05 mm thick; seed 5 mm long, ellipsoid; apical mesocarp with strong fibers up the sides, cavernous and with longitudinal membranes within; basal mesocarp fibrous and fleshy.

STAMINATE PLANT (*Ledermann 12,335a*): Leaves resembling those of the pistillate plants; staminate inflorescence in a husk of numerous enwrapping bracts, the lowest one 47 cm long, 4 cm wide, the upper half foliaceous, the lower half hard and apparently colored; middle bracts 3 cm wide, long exceeding the spike (but their upper parts cut away by the collector), hard, apparently reddish, the margins with prickles 0.3–0.5 mm long, 0.5–2 mm apart, arcuate subulate, ascending; spike solitary, about 15 cm long, 15 mm in diameter, cylindric, dense; stamens in fascicles of about 8, the column 3 mm long, 1.5 mm in diameter; anthers erect, 2 mm long, linear oblong, bearing a subulate apical prolongation of the connective 0.15–0.2 mm long.

HOLOTYPE: Neu-Guinea, Kaiserin Augusta Fluss Exped., Hunsteinspitze, bemooster montaner Urwald, 1,300 m alt, 28 Feb. 1913, C. *Ledermann 11,117* (B).

SPECIMENS EXAMINED: Neu-Guinea, Kaiserin Augusta Fluss Exped., 1912–13, without other data, C. *Ledermann 12,335a* (B), a staminate flowering specimen.

DISCUSSION: *P. congregatus* is a member of the section *Acrostigma*. The only close relative of the new species is represented by the collection from New Guinea, *St. John 26,207*, which will later be described as a new species.

Martelli left notes on the specimens indicating that he considered them to represent two undescribed species.

The new epithet is the Latin participle *congregatus*, assembled, and is given with allusion to the crowding of the syncarps in the spike.

Pandanus pentagonos sp. nov. (sect. *Acrostigma*)

Fig. 303

DIAGNOSIS HOLOTYPE: Planta acaulescens, foliis 1.83 (+0.02?) m longis in medio 3.7 cm latis proxima basem 3 cm latis rigidis coriaceis supra obscure lucidis viridibus infra exlucidis et pallidioribus V-sulcatis 2-plicatis in sectione mediali cum 37 nervis parallelis secundariis in quoque dimidio nervis tertiis reticulis breviter oblongis obscuris formantibus laminis subulatis in parte $\frac{1}{10}$ ultima in apice breviter crasse subulato deminuentibus et in puncto circa 10 cm ex apice 20 mm lato basi inermi pallida, ex 5 cm marginibus cum aculeis 0.6–1 mm longis 5–10 mm separatis validis lancei-subulatis compressis adscendentibus stramineis, midnervo infra per 75 cm inermi, in sectione mediali marginibus cum aculeis 1–1.5 mm longis 4–8 mm separatis rectis vel subarcuatis crasse subulatis adscendentibus stramineis, midnervo infra cum aculeis 0.6–1 mm longis 5–10 mm separatis arcuatis graciliter subulatis subadscendentibus stramineis, in sectione apicali marginibus et midnervo infra cum serrulis 0.3–0.6 mm longis 1–2.5 mm separatis stramineis, ad apicem plicis supra cum aculeis 0.3–0.7 mm longis 2–6 mm separatis crassiter arcuatis subulatis adscendentibus luteis, syncarpio circa 7 cm diametro sanguineo, drupis 23.5–25 mm longis 5 mm latis 4 mm crassis anguste oblancei-fusiformibus parte $\frac{1}{3}$ superia libera, pileo 7–8 mm alto ovoideo exlucido supra laevi infra minime scabro anguste 5-anguloso, stylo 2 mm longo valido subulato rigido curvato, stigmatibus 1.5 mm longo lineari palliditer brunneo papilloso non ad apicem extento, endo-

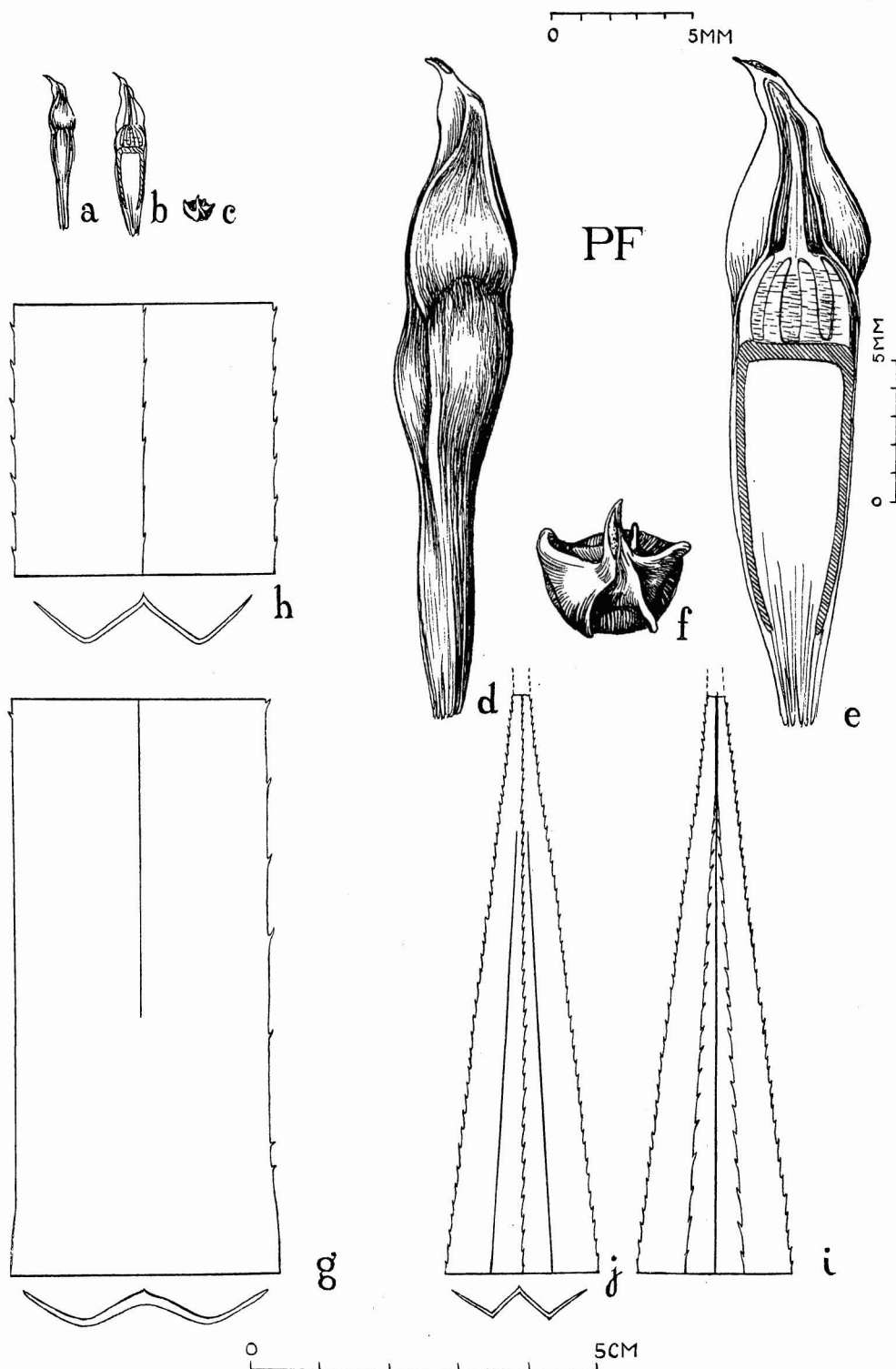


FIG. 303. *Pandanus pentagonos* St. John, from holotype. *a*, drupe, lateral view, $\times 1$; *b*, drupe, longitudinal median section, $\times 1$; *c*, drupe, apical view, $\times 1$; *d*, drupe, lateral view, $\times 4$; *e*, drupe, longitudinal median section, $\times 4$; *f*, drupe, apical view, $\times 4$; *g*, leaf base, lower side, $\times 1$; *h*, leaf middle, lower side, $\times 1$; *i*, leaf apex, upper side, $\times 1$; *j*, leaf apex, lower side, $\times 1$.

carpio 9 mm longo anguste obconico stramineo lateribus 0.1 mm latis osseoso intra laevi lucido, semine 3.5–4 mm diametro, mesocarpio apicali 4.5–5 mm longo cavernoso ellipsoideo cum membranis pallidis multis, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Plant acaulescent; leaves 1.83 (+0.02?) m long, 3.7 cm wide near the middle, 3 cm wide near the base, rigid, coriaceous, above dark shiny green, below paler and dull, V-sulcate, 2-pleated, at midsection with 37 parallel secondary veins in each half, the tertiary crossveins not conspicuous but visible nearly throughout, forming short oblong meshes, the blade almost ligulate, in outer $\frac{1}{10}$ tapering into a short, thick subulate apex (the tip lost from ours), but at the point about 10 cm down 20 mm wide, the base unarmed, pale; beginning at 5 cm from the base the margins with prickles 0.6–1 mm long, 5–10 mm apart, stout lance-subulate, compressed, ascending, stramineous; the midrib below unarmed for the lower 75 cm; at midsection the margins with prickles 1–1.5 mm long, 4–8 mm apart, straight or subarcuate, stout subulate, ascending, stramineous; the nearby midrib below with prickles 0.6–1 mm long, 5–10 mm apart, arcuate slender subulate, subascending, stramineous; near the apex the margins and midrib below with serrulations 0.3–0.6 mm long, 1–2.5 mm apart, stramineous; and near the apex the pleats above with prickles 0.3–0.7 mm long, 2–6 mm apart, stout arcuate subulate, ascending, yellowish; syncarp about 7 cm in diameter, solitary, blood red; drupes 23.5–25 mm long, 5 mm wide, 4 mm thick, narrowly oblong-fusiform, upper $\frac{1}{3}$ free; pileus 7–8 mm high, ovoid, dull, smooth above, near the base slightly roughened, sharply 5-angled; style 2 mm long, stout subulate, curved, rigid; stigma 1.5 mm long, linear, pale brown, papillose, not reaching the tip; endocarp 9 mm long, narrowly obconic, stramineous, the walls 0.1 mm thick, bony, within smooth, shiny; seed 3.5–4 mm in diameter; apical mesocarp 4.5–5 mm long, an ellipsoid cavern with numerous pale membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australian New Guinea, Morobe Prov., Wareo, high forest, cart road, 2,000 ft

alt, Jan. 7, 1936, J. & M. S. Clemens 1,537 (BR). Isotype (L)!

SPECIMENS EXAMINED: Australian New Guinea, Morobe Dist., Sattelberg, woods nr. mission, 3,000 ft alt, 10.11.1935, J. & M. S. Clemens 861 (L); Quembung [near Sattelberg], hill forests, 2,500 ft alt, Dec. 12, 1935, J. & M. S. Clemens 1,128 (L).

DISCUSSION: *P. pentagonos* is a member of the section *Acrostigma*, as is its closest relative, *P. Inokumae* Kanehira, of Nabire, Netherlands New Guinea, a species with the drupes 3–4 mm broad, the upper $\frac{1}{2}$ free; pileus lanceoloid; style 3–4 mm long; and the leaves 75 cm long, and 5 cm broad. *P. pentagonos* has its drupes 5 mm broad, the upper $\frac{1}{3}$ free; pileus ovoid; style 2 mm long; leaves 185 cm long, and 3.7 cm wide.

P. pentagonos seems to belong in *Acrostigma*, though its short, stout, subulate style makes it appear odd in that section.

The new epithet is the Greek adjective *pentagonos*, five-angled, and is given with reference to the 5-angled pileus.

SECTION *Galeatistigma* sect. nov.

Stylo subapicali galeato lato horizontali, margine rotundato vel denticulato, drupis 1-loculatis, syncarpio late ellipsoideo plerumque cum bracteis clausis, pedunculo axillari cum bracteis ovatis vel lanceolatis imbricatis multis clausis. Inflorescentia mascula cylindrica cum bracteis simulantibus clausis, spica solitaria elliptici-cylindrica, columna obconica cum staminibus multitudinis, filamentis inflatis et 2–4 in fasciculis conjunctis, antheris late ellipticis et valde longioribus quam apices filamentarum.

Style subapical, a horizontal broad cartilaginous visor, the margin rounded or denticulate; drupes 1-celled; syncarp broadly ellipsoid, mostly covered by coriaceous bracts; peduncle axillary, concealed by many ovate to lanceolate imbricate bracts. Staminate inflorescence covered by similar imbricate bracts; spike solitary, elliptic-cylindric; column obconic, bearing hundreds of stamens; filaments tumid, united in fascicles of 2–4, the broad elliptic anthers much longer than the filamentous free filament tips.

HOLOTYPE: *P. lamprocephalus* Merr. & Perry, of the Solomon Islands.

The section also contains *P. Joskei* Balf. f., of Fiji.

The new name is formed from the Latin *galeatus*, with a visor, and *stigma*, a brand or stigma, and is given with reference to the visor-like style which covers the stigma.

The following text can be used to insert this new section in the author's key to sections in part 1 of this revision.

Read for the second heading *D*:

D. Stigmas narrower than the apex of the drupe, less than $\frac{2}{3}$ its width,

Syncarps ellipsoid or subglobose,

Style lateral, divergent, broad toothlike; syncarps ellipsoid or subglobose.

..... *Lophostigma*

Style subterminal, flush near apex of drupe; peduncle axillary, it and syncarp covered by imbricate bracts; syncarps ellipsoid. *Galeatistigma*

Syncarps cylindric, with rounded ends; style flush, a little off-center on apex of drupe, a 2- or more-toothed visor; syncarp enclosed by numerous colored bracts. *Maysops*

Pandanus lamprocephalus Merr. & Perry, Jour. Arn. Arb. 20: 181-182, pl. 2, fig. 4, 4a-b, 1939 (sect. *Galeatistigma*)

Figs. 304-305

EXPANDED DIAGNOSIS OF ISOTYPE: Treelike, 5 m tall; trunk 7 cm in diameter, unbranched, with faint leaf scars and with scattered small prickles; prop roots few, thick; leaves 2.4 m long, 7-8 cm wide near the base, 7.8 cm wide at the middle, coriaceous, above dark green and somewhat shiny, below pale green and apparently glaucous, U-sulcate, 2-pleated, at midsection with 98 parallel secondary veins on each side, and except near the base the tertiary veins evident, forming short oblong meshes, blade ligulate, the apex contracted, concave, acute, the base unarmed, orange-yellow above and below; beginning at 7.5-8 cm up the margins with prickles 0.8-1.5 mm long, 2-4 mm apart, obliquely lance-deltoid, obtuse, ascending, pale with dark brown tips; the midrib below un-

armed, apparently to beyond the middle; at midsection the margins with prickles 0.7-1 mm long, 3-12 mm apart, arcuate lance-subulate, compressed, strongly ascending, reddish black; the apex not preserved; pistillate inflorescence axillary, bearing a solitary syncarp; peduncle 18-21 cm long, 7-8 mm in diameter, completely covered by the numerous, persistent, imbricate bracts ascending in 3 tiers, the lower ones orange, the upper ones purple, the lower ones 4 cm long, broadly deltoid, navicular, coriaceous, unarmed; the middle bracts 9 cm long, lanceolate; the upper bracts which enclose the syncarp in flower 10 cm long, 5 cm wide, lanceolate, the back rounded, the midrib obscure, the upper margins minutely subulate-serrulate; infructescence with peduncle and bracts similar except that the upper sheathing ones do not cover the upper $\frac{1}{3}$ of the syncarp and may be partly eroded; syncarp in fruit 8-11 cm long, 6.5-8 cm in diameter, broadly ellipsoid, perceptibly 3-sided, bearing 222-276 drupes, these 28-34 mm long, 10-15 mm wide, 8-12 mm thick, oblanceoloid, compressed, 5-6-angled, widest and with a rounded swelling at the apex of the contiguous sides, upper $\frac{1}{4}$ free; pileus 8-9 mm high, the margins rounded, then low obtuse, and from this ledgelike rim rises a larger pyramidal apex, the surface smooth, dull; style 4-5 mm wide, brown, bony, shining, forming a truncate or suboblique apex of the drupe, its margin lateral and salient, either rounded or slightly erose; stigma equally broad, transversely elliptic, vertical under the stylar visor, brown, papillose; endocarp in upper $\frac{1}{3}$ and 12-14 mm long, obovoid, bony, dark brown, the walls 1.5-2 mm thick, within smooth, shining; seed 5-8 mm in diameter; apical mesocarp 3-4 mm long, with fibers and solid parenchyma; basal mesocarp 15-17 mm long, fibrous and fleshy.

DESCRIPTION OF STAMINATE PLANT (*L. J. Brass* 2,878 in part): Staminate inflorescence detached, but apparently borne on an imbricate bracteate peduncle like that of the pistillate, 20 cm long; upper bracts 23 cm long, 5 cm wide, concave, coriaceous, colored, persistent, mostly unarmed, but with a few tiny subulate prickles near the apex on margins and midrib, and at midsection for some distance with fragile subu-

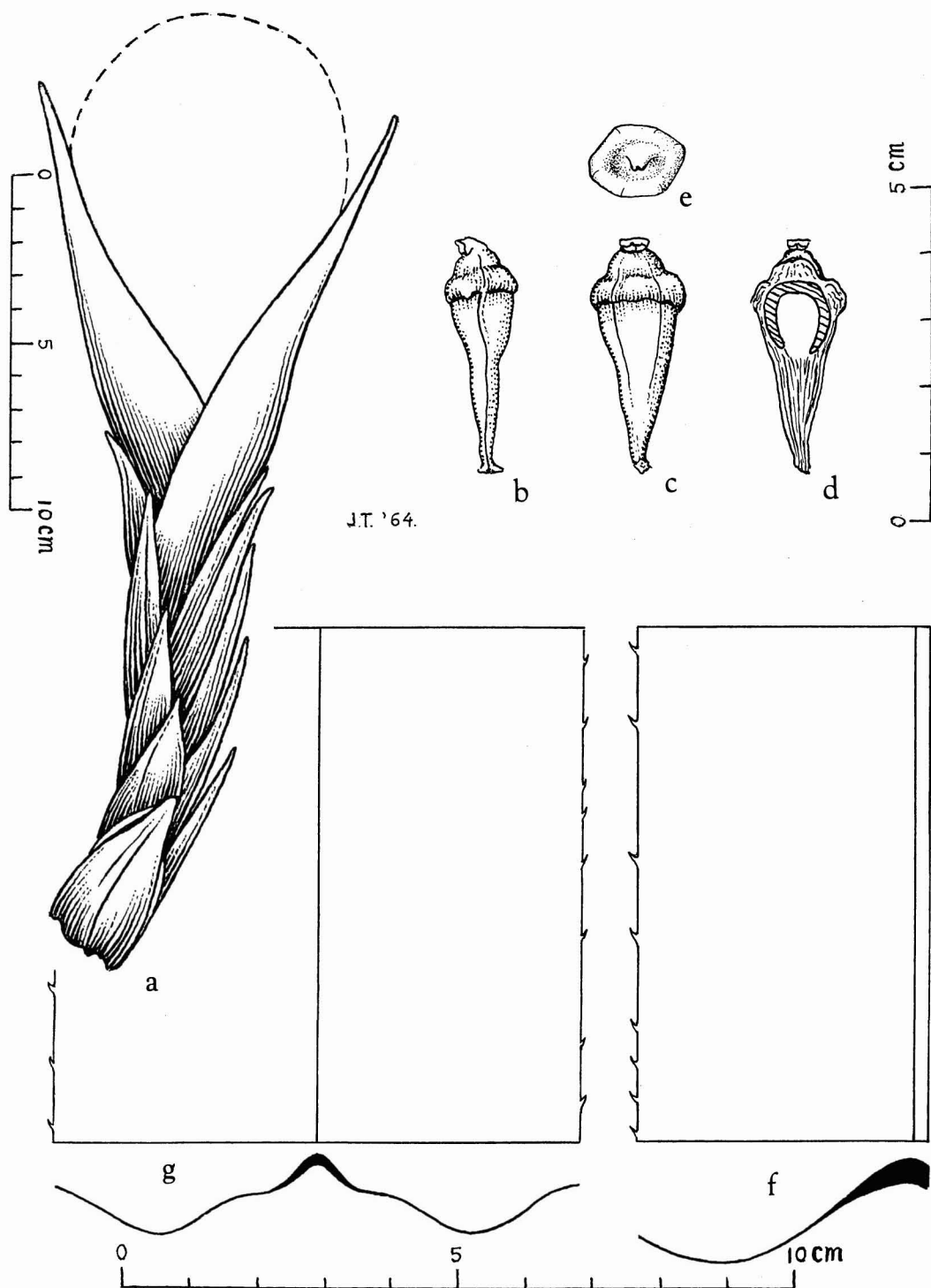


FIG. 304. *Pandanus lamprocephalus* Merr. & Perry, from isotype. *a*, infructescence, $\times \frac{1}{2}$; *b*, drupe, lateral view, $\times 1$; *c*, drupe, proximal lateral view, $\times 1$; *d*, drupe, longitudinal median section, $\times 1$; *e*, drupe, apical view, $\times 1$; *f*, leaf base, half of lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$.

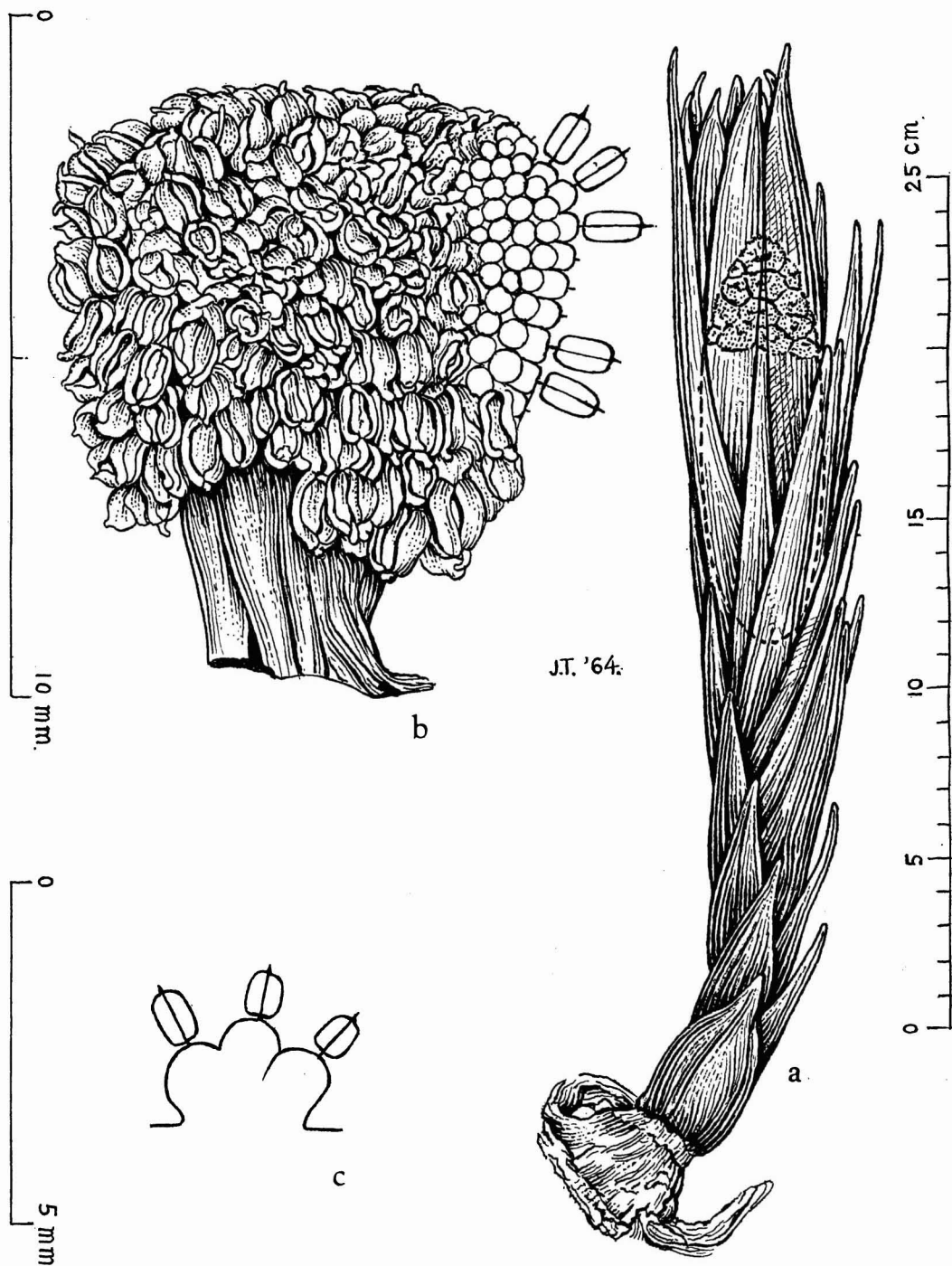


FIG. 305. *Pandanus lamprocephalus* Merr. & Perry, staminate, from Brass 2,878, in part (L). *a*, staminate inflorescence, $\times \frac{1}{2}$; *b*, staminal cluster, with column, filaments, and anthers, $\times 10$; *c*, staminal fascicle, lateral view, $\times 10$.

late prickles 0.3–0.5 mm long; staminate spike solitary, concealed by the bracts, 12 cm long, 3 cm in diameter, cylindric-ellipsoid, densely covered by staminal branches, these with a peduncle 2–3 mm long and in diameter, bearing an obconic firm tip 6–7 mm long, 7–8 mm in diameter, completely covered by the many hundreds of stamens, these borne in fascicles 2–3 mm long, containing 2–4 stamens, the united base 1–2 mm long, 2–3.5 mm wide, flat; free filament tips 0.5–1.5 mm long, clavate, firm, broader than the anthers, attachment to the anther short and filamentous; anthers 0.7–0.8 mm long, elliptic-oblong to cordate, bearing at the apex a subulate prolongation of the connective 0.1–0.2 mm long.

HOLOTYPE: "Solomon Islands: San Cristoval Island, Hinuahaoro, *L. J. Brass* 2,878, Sept. 16, 1932, mountain rain-forests, at 900 m alt." (A). Type examined. Isotypes (BISH, L).

SPECIMENS EXAMINED: Solomon Islands, San Cristoval, Hinuahaoro, *L. J. Brass* 2,878 in part (L). A note states, the only staminate inflorescence collected.

DISCUSSION: *P. lamprocephalus* was assigned by its authors, Merrill and Perry, to the section *Lophostigma* which was based on several species from New Caledonia. This section is now typified by one of these, *P. viscidus* (Brongn.) Solms, and is characterized by having the broad, toothlike style and stigma lateral on the rim of the apex of the drupe.

SECTION *Liniobtutus* sect. nov. (subgen.
Pandanus)

DIAGNOSIS: Phalangibus pluricarpelatis, carpelibus in linea unica, stigmatibus verticalibus vel obliquis transversiter ellipticis et alterniter ad dextram vel sinistram obtutis. Plantis masculis incognitis.

Phalanges several-celled, the carpels arranged in a single line; styles cuneate oblong, horizontal, interlaced; stigmas vertical or oblique, transversely elliptic, and directed alternately to the right and left sides. Staminate plants unknown.

HOLOTYPE: *Pandanus Hooglandii* St. John.

DISCUSSION: The new name is derived from the Latin *linea*, line; *obtutus*, a looking at, and is

given with reference to the stigmas which are directed alternately right and left of the line marking the apex of the carpels.

To insert this in the key to sections, in part 1, p. 2, for the first O. read:

O. Carpels in 1 transverse line or in several such lines,

P. Stigmas all facing the same side.

..... *Hombronia*

P. Stigmas interlaced and alternately facing the right and left sides.

..... *Liniobtutus*

Pandanus Hooglandii sp. nov. (sect. *Liniobtutus*)

Fig. 306

NOM. VERN.: "engehri" (Orokaiva language, Mumuni).

DIAGNOSIS HOLOTYPE: Arbor 10 m alta dichotome pluriramosa, foliis 1.25 m longis in medio 3.6–4 cm latis proxima basem 3.2 cm latis subtiliter chartaceis supra viridibus infra palliditer viridibus et licet glaucis U-sulcatis 2-plicatis in sectione mediali cum 50 nervis parallelis secundariis in quoque dimidio nervis tertiis gracilibus sed in omnibus partibus evidentis et reticulis brevibus plerumque rhombicis formantibus laminis ligulatis sed in parte $\frac{1}{8}$ ultima deminuentibus (apice delapso) basi inermi pallida, marginibus ex 3–3.3 cm cum aculeis 0.8–1 mm longis 2–4 mm separatis arcuatis subulatis adscendentibus stramineis, midnervo infra per parte $\frac{1}{8}$ basali inermi, in sectione mediali marginibus cum aculeis 0.5 mm longis 3–5 mm separatis subarcuatis valde adscendentibus stramineis, midnervo infra cum aculeis 0.3 mm longis 2–5 mm separatis subulatis valde adscendentibus stramineis, proxima apicem marginibus cum subulati-serrulis 0.3–0.5 mm longis 1–2 mm separatis, phalangibus 4.6–5.2 cm longis 2.9–3.9 cm latis 1.7–2.3 cm crassis oblanceoloideis vel obovoideis valde compressis glaucis 4–5-angulosis lateribus subcurvatis vel planis parte $\frac{1}{8}$ supera libera sublaevibus sed minute punctatis, apice 11–15 mm latis subconcavis, stigmatibus in concavitate apicali congregatis, valleculis apicalibus nullis, sinibus lateralibus nullis, carpelibus 4–7 fere ad apicem connatis, stylis 2–3 mm longis cuneatis ob-

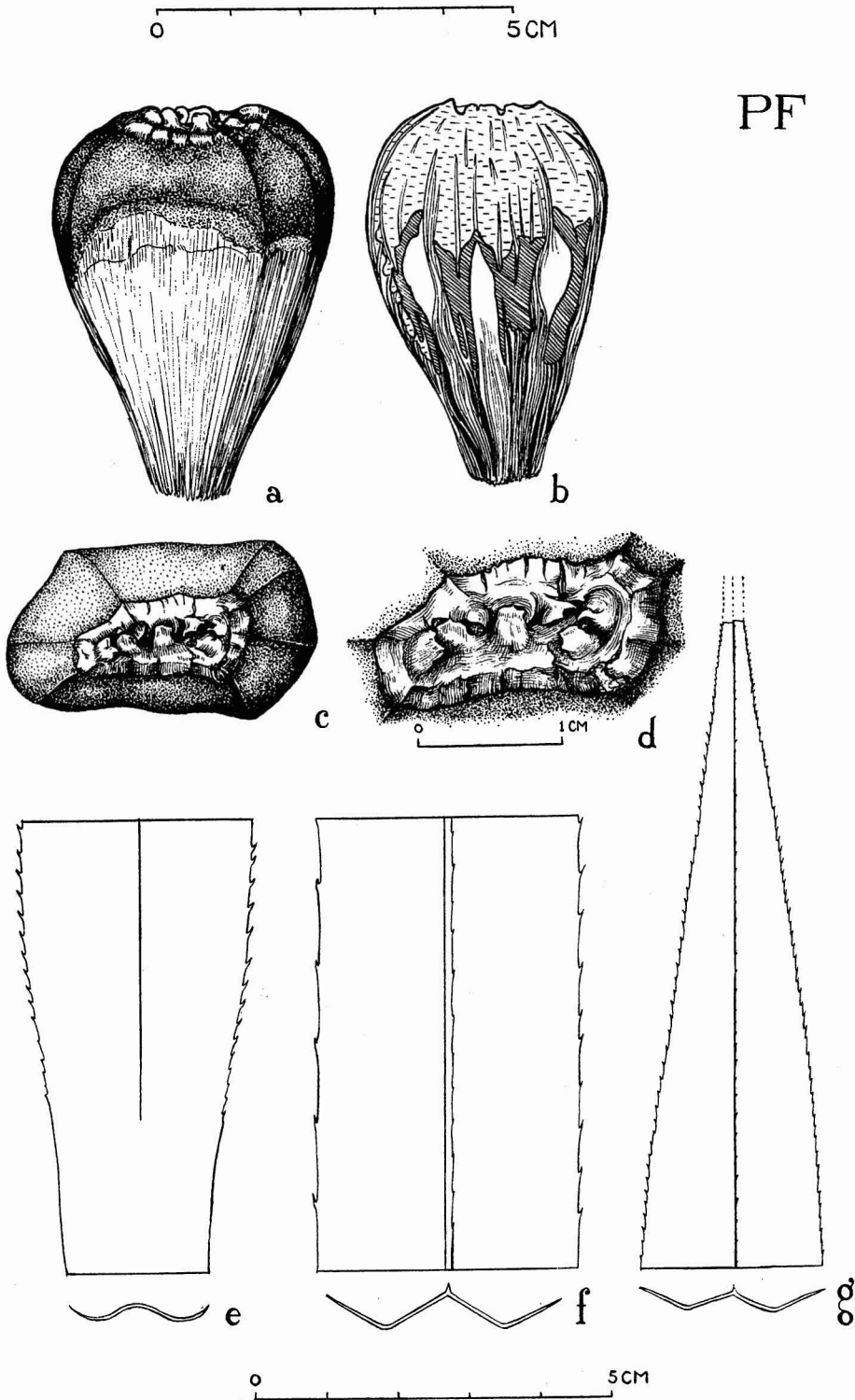


FIG. 306. *Pandanus Hooglandii* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, styles and stigmas, apical view, $\times 2$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

longis horizontalibus bidentatis, stylis alternante rectis vel sinistris et intertectis compressis stramineis, stigmatibus 2–2.5 mm latis obscure brunneis papillois transverse ellipticis sed in parte clausis, endocarpio mediali 22–25 mm longo osseoso brunneo breviter cuneato cylindrico lateribus lateralibus 2–4 mm crassis intra laevibus lucidis, seminibus 7–9 mm longis late ellipsoideis, mesocarpio apicali 11–15 mm longo parte $\frac{1}{2}$ supera cum parenchyma solida parte infera cum fibris et parenchyma dispersa, mesocarpio basali 15–18 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 10 m tall, dichotomously several branched; leaves 1.25 m long, 3.6–4 cm wide at the middle, 3.2 cm wide near the base, thin chartaceous, above green, below pale green and apparently glaucous, U-sulcate, 2-pleated, at midsection with 50 parallel secondary veins in each half, the tertiary cross-veins slender, seen nearly throughout, forming short mostly rhombic meshes, blades ligulate but in outer $\frac{1}{8}$ narrowing towards the tip (apex lost), base unarmed, pale; beginning 3–3.3 cm from the base the margins with prickles 0.8–1 mm long, 2–4 mm apart, subulate, arcuate, ascending, stramineous; the midrib below unarmed for the lower $\frac{1}{3}$; at midsection the margins with prickles 0.5 mm long, 3–5 mm apart, subarcuate subulate, strongly ascending, stramineous; midrib below with prickles 0.3 mm long, 2–5 mm apart, subulate, strongly ascending, stramineous; towards the apex the margins with teeth 0.3–0.5 mm long, 1–2 mm apart, subulate-serrulations; syncarp not preserved; phalanges 4.6–5.2 cm long, 2.9–3.9 cm wide, 1.7–2.3 cm thick, oblanceoloid to obovoid, strongly compressed, glaucous, 4–5-angled, the sides gently curved to flattish, upper $\frac{1}{3}$ free, smoothish but minutely punctate, the apex 11–15 mm wide, gently concave, and here the stigmas are crowded, apical valleys none; lateral sinuses none; carpels 4–7, fused almost to the tip; styles 2–3 mm long, cuneate, oblong, horizontal, the apex with 2 lateral teeth, the styles alternately directed to the right or left side and interlacing, bony, flattened, stramineous; stigmas 2–2.5 mm wide, dark brown, papillose, transversely elliptic, but partly concealed by the infolded lower edges of the style;

endocarp median, 22–25 mm long, bony, brown, short cuneate cylindric, with ascending and descending flanges, lateral walls 2–4 mm thick, within smooth, shining; seeds 7–9 mm long, broad ellipsoid; apical mesocarp 11–15 mm long, the upper half of dense parenchyma, the lower half of fibers and loose parenchyma; basal mesocarp 15–18 mm long, fibrous and fleshy.

HOLOTYPE: Papua, Northern Div., 3 km N.W. of Gwaiari village, swamp forest, 25 m alt, 16.8.1953, R. D. Hoogland 3,658 (K). Isotypes (A, LAE).

DISCUSSION: *P. Hooglandii* is the monotypic basis of the new section *Liniobututus*. Its stigmas are in linear arrangement like those of the section *Hombromia*, but differ by being interlaced and directed alternately right and left.

This new species is named in honor of its collector, Dr. Ruurd Dirk Hoogland of Canberra, Australia, botanist with the Commonwealth Scientific and Industrial Research Organization.

***Pandanus antaresensis* sp. nov. (sect. *Mammillarisia*)**

Figs. 307, 308, 309

DIAGNOSIS HOLOTYPE: Arbor 23 m alta, trunco 16 m alto ramoso, radicibus fulturosis ad 9 m altis, foliis 2.27 (+0.02–0.06 ?) m longis in medio 10 cm latis proxima basem 8.5 cm latis coriaceis lucidis supra obscure viridibus infra palliditer caerulei-viridibus et glaucis late V-sulcatis 2-plicatis in sectione mediali cum 86 nervis parallelis secundariis in quoque dimidio nervis tertiis nullis laminis subligulatis sed in parte $\frac{1}{4}$ ultima in apice trigono subulato deminuentibus (apice delapso) basi inermi pallida vel subbrunnea, marginibus in 10.5–13 cm ex basi cum aculeis 2–3 mm longis 3–8 mm separatis basi conica apice crasse subulato subadscendenti brunneo, midnervo ex basi ad medium inermi, in sectione mediali marginibus cum aculeis 1–1.6 mm longis 3–8 mm separatis arcuatis crassiter subulatis valde adscendentibus apicibus brunneis biformatis majoribus et minoribus alternantibus, midnervo infra cum aculeis 1–1.3 mm longis 7–17 mm separatis arcuatis crassiter subulatis compressis valde

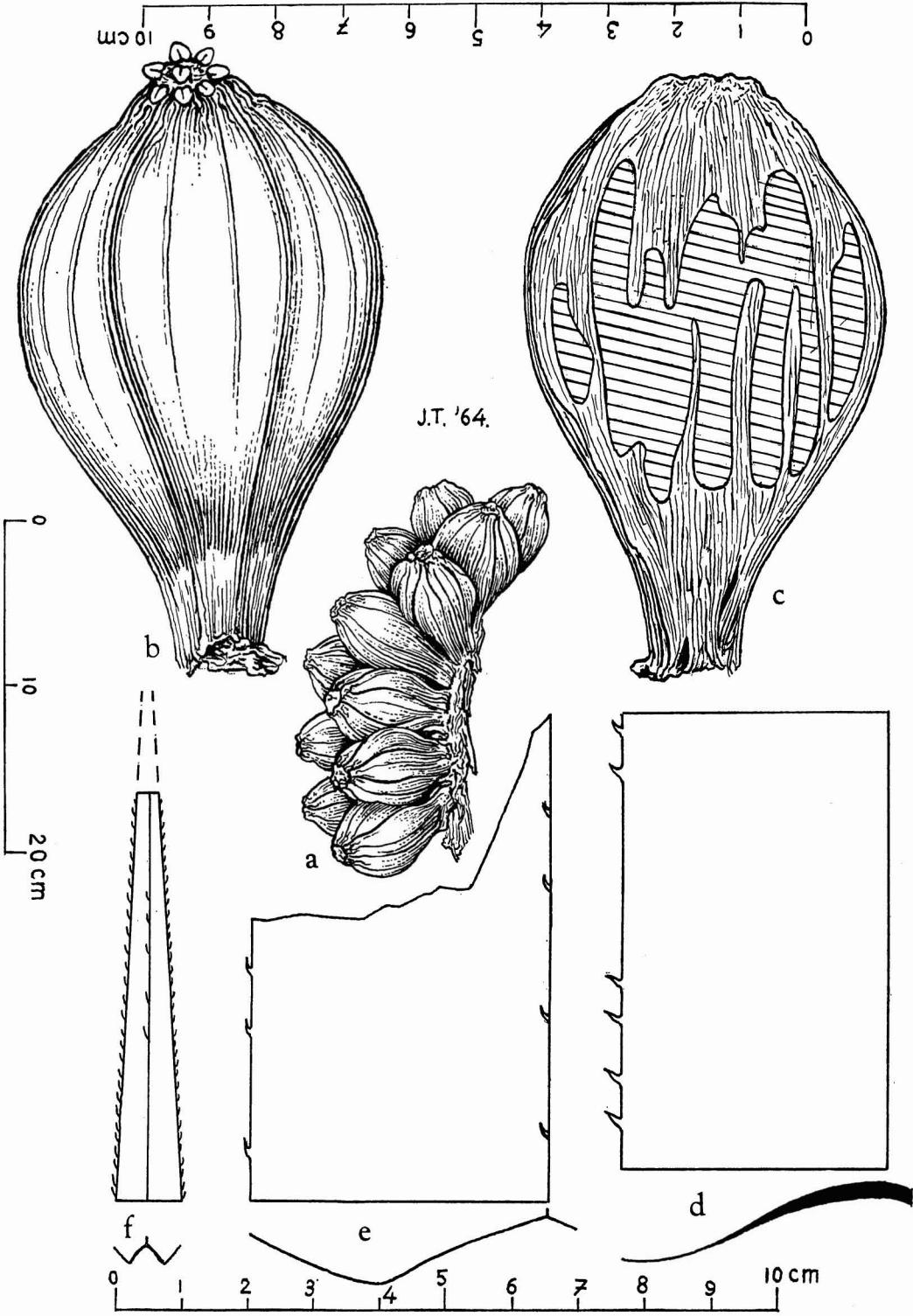


FIG. 307. *Pandanus antaresensis* St. John, from holotype. *a*, part of syncarp, $\times \frac{1}{4}$; *b*, phalange, lateral view, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, half of leaf base, lower side, $\times 1$; *e*, half of leaf middle, lower side, $\times 1$; *f*, leaf apex, lower side, $\times 1$.

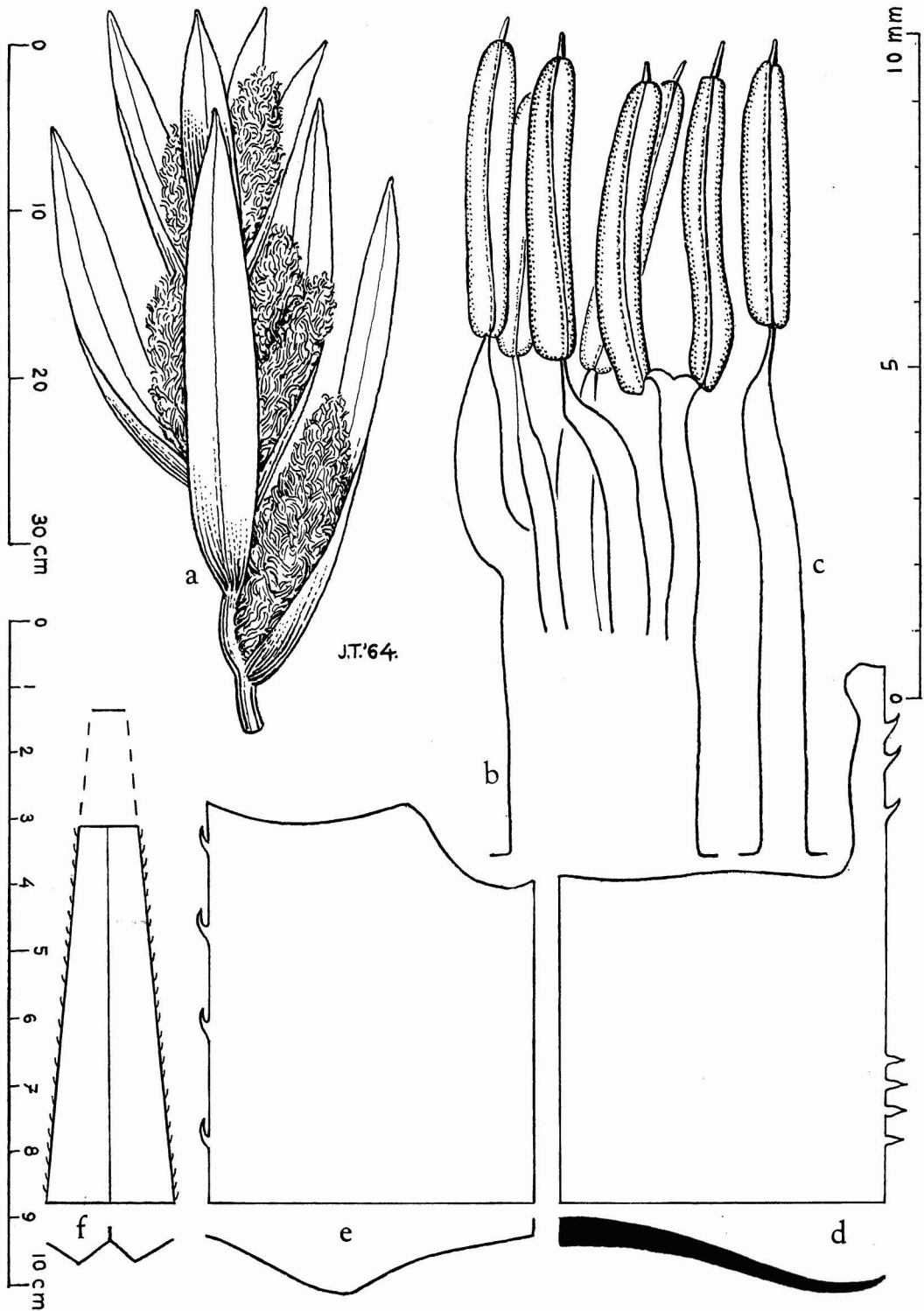


FIG. 308. *Pandanus antaresensis* St. John, staminate, from Kalkman 4,411. *a*, staminate inflorescence, $\times \frac{1}{4}$; *b*, staminate fascicle, $\times 10$; *c*, solitary stamen, $\times 10$; *d*, half of leaf base, lower side, $\times 1$; *e*, half of leaf middle, lower side, $\times 1$; *f*, leaf apex, lower side, $\times 1$.



FIG. 309. *Pandanus antaresensis* St. John, staminate inflorescence, Kalkman 4,411, held by C. Kalkman. Photo by J. J. Staats.

adscendentibus apicibus brunneis, ad apicem marginibus cum aculeis 0.8–1 mm longis 0.5–2 mm separatis graciliter subulatis adscendentibus sed in media geniculatis et apicibus cum margine parallelis, midnervo infra cum aculeis simulantibus sed minoribus et remotioribus, pedunculo 1 m longo, syncarpio solitario 35 cm longo 25 cm diametro licet ovoideo et sine bracteis, phalangibus 8.5–9 cm longis 5–6.3 cm latis 4–5 cm crassis aurantiacis sed apice brunneo pyriformibus 5–6-angulis majoribus et 2–3-plo angulis secundariis prominentibus acutis ex apice $\frac{1}{3}$ – $\frac{1}{2}$ parte lateribus interobseratis parte $\frac{1}{2}$ supra libera lucida sublaevi sed ad apicem punctata, apice 14–17 mm lato elliptico concavo et cum stigmatibus aggregatis, sinibus apicalibus non evidentis, stigmatibus 7–9 plerumque 8 et 3–4 mm latis cordatis vel reniformi-

bus non elevatis centripetalibus brunneis papillois, endocarpio supramediali 5 cm longo suborbiculari sed cum lobis ligulatis adscendentibus osseoso obscure rubri-brunneo lateribus lateralibus 4–5 mm crassis intra laevibus lucidis, seminibus 2–3 cm longis cylindricis, mesocarpio apicali cum fibris et parenchyma solida et cum cavernis fusiformibus, mesocarpio basali fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 23 m tall, bole 16 m tall, branching to form a crown; prop roots up to 9 m tall; leaves 2.27 (+0.02–0.06 ?) m long, 10 cm wide at the middle, 8.5 cm wide near the base, coriaceous, shiny, dark green above, below pale bluish green and glaucous, widely V-sulcate, 2-pleated, at midsection with 86 parallel secondary veins in each half, no tertiary veins; the blade nearly strap-shaped, but in outer $\frac{1}{4}$ tapering into the trigonous subulate apex (the tip lost in ours), the base unarmed, pale or brownish; beginning at 10.5–13 cm from the base the margins with prickles 2–3 mm long, 3–8 mm apart, the base conic, the thick subulate tip slightly ascending, brown; the midrib below unarmed almost to the middle; at midsection the margins with prickles 1–1.6 mm long, 3–8 mm apart, arcuate thick subulate, strongly ascending, brown tipped, distinctly of two kinds, large and small alternating; the nearby midrib below with prickles 1–1.3 mm long, 7–17 mm apart, arcuate thick subulate, compressed, strongly ascending, brown-tipped; towards the apex the margins with prickles 0.8–1 mm long, 0.5–2 mm apart, slender subulate, ascending, then bent and the apex parallel with the margin, brown; those of the midrib below similar but smaller and more remote; infructescence with a solitary syncarp; peduncle about 1 m long; syncarp 35 cm long, 25 cm in diameter, apparently ovoid, and said to be bractless; phalanges 8.5–9 cm long, 5–6.3 cm wide, 4–5 cm thick, orange except for the brownish apex, pyriform, with 5–6 major angles and 2–3 times as many prominent sharp secondary ones running from the apex to $\frac{1}{3}$ – $\frac{1}{2}$ way down, the sides mortised with the adjacent phalanges, upper $\frac{1}{2}$ free, the surface shining, rather smooth but punctate especially upwards; apex 14–17 mm wide, elliptic, concave, and all of its surface occupied by the crowded stigmas,

sinuses not perceptible; stigmas 7–9, mostly 8, and 3–4 mm wide, cordate to reniform, flush, centripetal, brown, papillose; endocarp supra-median, 5 cm long, suborbicular in outline, but with numerous ligulate upward lobes, bony, dark reddish brown, the lateral wall 4–5 mm thick, within smooth, shining; seeds 2–3 cm long, cylindric; apical mesocarp mostly solid with fibers and parenchyma, but also with several fusiform cavities; basal mesocarp fibrous and fleshy.

STAMINATE TREE (*C. Kalkman 4,411*): Tree 22 m tall; bole 16 m tall; prop roots to 8 m tall; leaves 1.98 (+0.08–0.15?) m long, 10.6 cm wide at middle and base, coriaceous, above shiny dark green, below pale yellowish green and glaucous, U-sulcate, 2-pleated, at midsection with 98 parallel secondary veins in each half, the tertiary veins seen on both sides in lower third, forming short oblong or rhombic meshes, blade ligulate but in outer $\frac{1}{3}$ narrowing to the apex (probably subulate, but lost in ours), beginning at 12 cm up the margins with prickles 2.5–3.5 mm long, 2–6 mm apart, stout subulate, salient, black; the midrib below unarmed for the lower $\frac{2}{3}$; at midsection the margins with prickles 1.7–2 mm long, 8–33 mm apart, arcuate subulate from a broad base, compressed, appressed ascending, dark brown, shiny; towards apex the margins with prickles 0.7–1 mm long, 1–3 mm apart, arcuate stout subulate, strongly ascending, brown, shiny; (the midrib below torn and not evident); staminate inflorescence massive, pendent; peduncle 30 cm long with a few sterile bracts; bracteate rhachis 1.6 m long, the bracts yellowish white, soft herbaceous; lowest bract about 1 m long, lanceolate, nearly equaling the inflorescence; median bract 30 cm long, 5 cm wide, lance-elliptic, the midrib unarmed, the margins with weak, fragile, subulate prickles 0.3–0.5 mm long; spikes numerous 10–16 cm long, 2–3 cm in diameter, cylindric, dense, wholly light yellow; stamens mostly in fascicles of 3–7, 12 mm long, the filaments united laterally for 2–4 mm into a flat column 2–3 mm wide; free filament tips mostly 3–5 mm long, 0.5 mm in diameter, firm, at apex abruptly narrowed into a slender subulate, often recurved tip making a versatile connection; anthers 3.5–3.8 mm long, 0.5 mm wide,

narrowly oblong, bearing a weak subulate prolongation of the connective 0.1–0.2 mm long.

HOLOTYPE: Nederlands Nieuw-Guinea, Star Mts., Mt. Antares, 1 km E of junction of Bon and Minam rivers, primary forest, 1,500 m alt, July 4, 1959, *C. Kalkman 4,367* (L). Isotypes (A, BM)!

SPECIMENS EXAMINED: Nederlands Nieuw-Guinea, Star Mts., Mt. Antares, 1 km E of junction of Bon and Minam rivers, primary forest, 1,500 m alt, July 9, 1959, *C. Kalkman 4,411* (BM, L), staminate.

DISCUSSION: *P. antaresensis* is a member of the section *Mammillarisia*, as is its somewhat distant relative, *P. Kaernbachii* Warb., which has the syncarp globose, 20 cm in diameter, surrounded by bracts, solitary or 2–3 and spicate; phalanges 3–4 cm wide, narrowly pyriform; apical sinuses distinct between all stigmas (and apparently 1–2 mm deep); leaves unknown, and holotype, once in Berlin, now destroyed. *P. antaresensis* has the syncarp ovoid, 25 cm in diameter, solitary, and apparently without conspicuous bracts; phalanges 5–6.3 cm wide, pyriform; apical sinuses none.

The new epithet is a geographic one, from the name of the type locality, Mt. Antares, plus the Latin adjectival place ending, *-ensis*.

Pandanus aprilensis sp. nov. (sect. *Maysops*)

Fig. 310

DIAGNOSIS HOLOTYPE: Radicibus caulibusque incognitis, foliis licet 2.5 m longis in medio 11.2 cm latis proxima basem 10.3 cm latis crassiter coriaceis supra viridibus infra pallidioribus V-sulcatis 2-plicatis in sectione mediale cum 91 nervis parallelis secundariis in quoque dimidio nervis tertiis nullis laminis latiter ligulatis apice delapso basi inermi pallida, proxima basem marginibus cum aculeis 0.6–1.3 mm longis 2–4 mm separatis arcuatis crassiter subulatis adscendentibus apicibus brunneis, ex licet 15–20 cm midnervo infra cum aculeis simulantibus sed reflexis, in sectione mediali marginibus cum aculeis 1.5–2 mm longis 5–12 mm separatis arcuatis crassiter subulatis ex basi crassa adscendentibus pallidis, apice incognito, infructescentia cum syncarpio solitario, pedunculo 35 cm longo 3 cm diametro bracteato, syncarpio

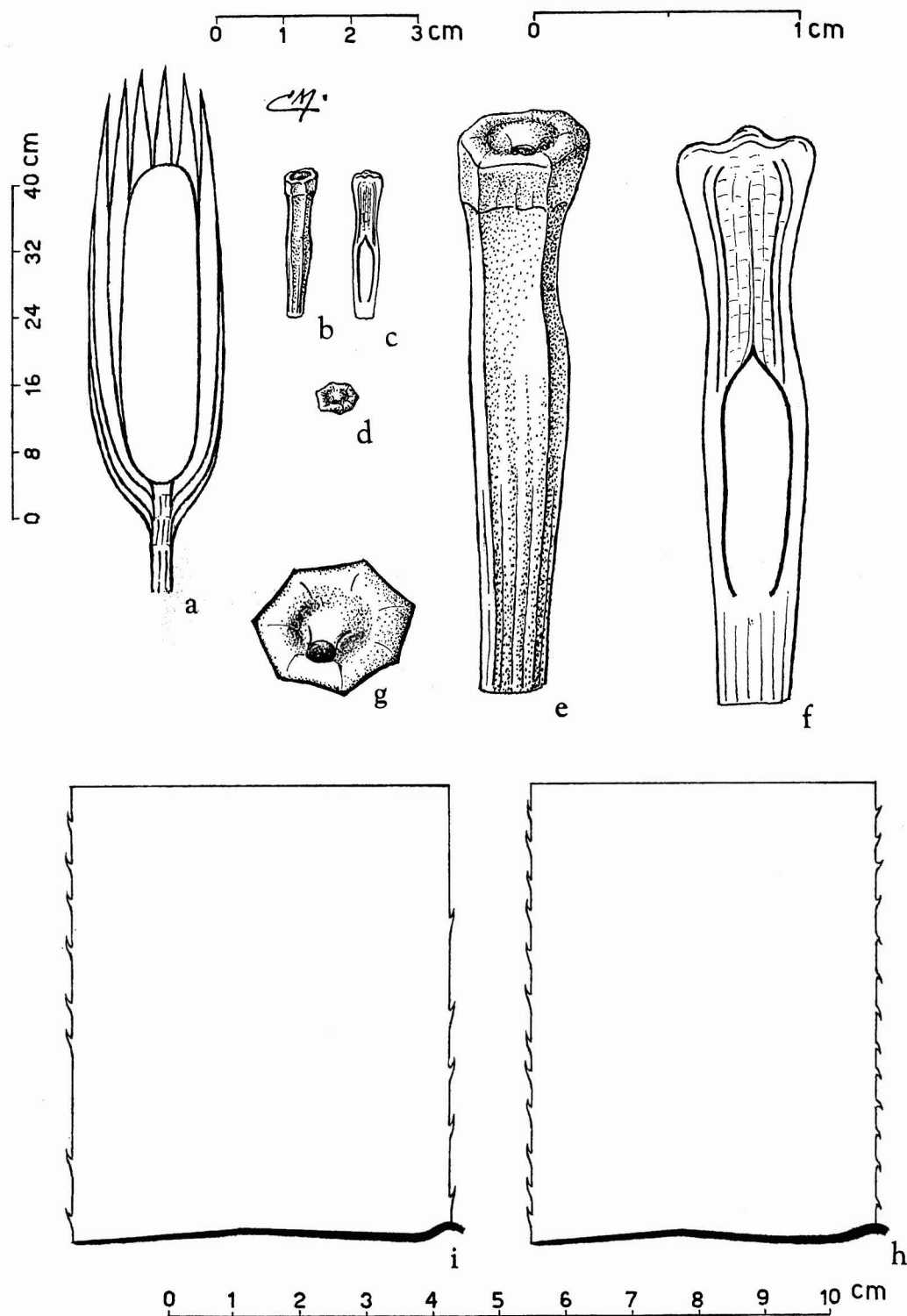


FIG. 310. *Pandanus aprilensis* St. John, from holotype. *a*, syncarp, $\times \frac{1}{8}$; *b*, drupe, lateral view, $\times 1$; *c*, drupe, longitudinal median section, $\times 1$; *d*, drupe, apical view, $\times 1$; *e*, drupe, lateral view, $\times 4$; *f*, drupe, longitudinal median section, $\times 4$; *g*, drupe, apical view, $\times 4$; *h*, half of leaf base, lower side, $\times 1$; *i*, half of leaf middle, lower side, $\times 1$.

licet 32 cm longo 8 cm diametro cylindrico, drupis 20–23 mm longis 4–6 mm latis 3–5 mm crassis prismaticis 6-lateratis parte $\frac{1}{10}$ supera libera, pileo 2.5 mm alto marginibus rotundatis in centro late concavo, stylo (ex umbo centrali) luteo cartilagineo lucido horizontali flabellato vel bifido et galea formanti, stigmatem infra eum lunato 0.7–1 mm lato brunneo papilloso, endocarpio submediali 9 mm longo ellipsoideo osseoso apice conico lateribus lateralibus 0.2 mm crassis palliditer brunneis intra laevibus viridiluteis exlucidis, mesocarpio apicali cum fibris longitudinalibus fortibus et supra cum parenchyma, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Roots and stems unknown; leaves about 2.5 m long, 11.2 cm wide at the middle, 10.3 cm wide near the base, thick coriaceous, green above, paler green below, V-sulcate, 2-pleated, at midsection with 91 parallel secondary veins in each half, but no visible tertiary veins, blade broad ligulate, the apex lost, the base unarmed, pale; near the base the margins with prickles 0.6–1.3 mm long, 2–4 mm apart, arcuate thick subulate, ascending, brown tipped; the midrib at perhaps 15–20 cm up with similar, reflexed prickles; at midsection the margins with prickles 1.5–2 mm long, 5–12 mm apart, arcuate thick subulate, broad based, ascending, pale; the nearby midrib below with prickles 0.2–0.3 mm long, 3–5 mm apart, weak subulate, flat appressed, ascending, pale; the apex not preserved; infructescence with a solitary syncarp; peduncle 35 cm long, 3 cm in diameter, bracteate; syncarp apparently 32 cm long, 8 cm in diameter, cylindric; drupes 20–23 mm long, 4–6 mm wide, 3–5 mm thick, prismatic, 6-sided, upper $\frac{1}{10}$ part free; pileus 2.5 mm high, the edges rounded, the center a broad concavity; style lateral from a central umbo, yellow, cartilaginous, shining, horizontal, flabellate to a bifid rim under which is the brown, papillose, lunate stigma, this 0.7–1 mm wide; endocarp slightly submedian, 9 mm long, ellipsoid, bony, the apex conic, the lateral walls 0.2 mm thick, pale brown, within smooth, dull, greenish yellow; apical mesocarp with strong longitudinal fibers and the upper part also with parenchyma; basal mesocarp fibrous and fleshy.

HOLOTYPE: Neu-Guinea, Kaiserin-Augusta Fluss Expedition, April Fluss, Standlager,

Alluvialwald, 40–60 m alt, 17 Sept. 1912, *Ledermann* 8,756 (B).

DISCUSSION: *P. aprilensis* is a member of the section *Maysops*, as is its closest relative, *P. microdontus* Merr. & Perry, of the Middle Fly River, Papua, a species with the drupes 2 cm long, 4 mm in diameter; endocarp 6–7 mm long; leaves about 3 m long, 7.5–8.5 cm wide; and the drupes rose-colored. *P. aprilensis* has its drupes 22–23 mm long, 4–6 mm wide; endocarp 9 mm long; leaves about 2.5 m long, 11.2 cm wide; and the drupes deep brick-red.

This was recognized as a new species by Martelli who gave it a manuscript name, but left it unpublished.

The new epithet is a geographic adjective made from the name of the type locality, the April River, with *-ensis*, the Latin adjectival place ending.

Pandanus biciliatus sp. nov. (sect. *Maysops*)

Fig. 311

DIAGNOSIS HOLOTYPE: Arbor 10 m alta multiramosa et cum radicibus fulturosis, foliis 1.49–1.74 m longis in medio 5.5 cm latis proxima basem 6–6.6 cm latis coriaceis supra viridibus et subglaucis infra palliditer viridibus et glaucissimis U-sulcatis 2-plicatis in sectione mediali cum 81 nervis parallelis secundariis in quoque dimidio nervis tertiis non evidentis lamina gladiata sensim in apice trigono crasso subulato deminuenti eo in puncto 10 cm ex apice 6 mm lato basi inermi pallida, ex 5.5–7 cm marginibus cum aculeis 0.5–2.5 mm separatis biformatis plerumque alternantibus majoribus 1.5–3 mm longis arcuatis crassiter subulatis reflexis pallidis sed apicibus rubris et minoribus 0.5–1.8 mm longis deltoideis vel crassiter subulatis adscendentibus vel salientibus apicibus rubris, midnervo infra ex 20.5 cm cum aculeis 1.2–1.8 mm longis basi conica apice subulato reflexo apicibus rubris, in sectione mediali marginibus cum aculeis 2–4 mm separatis biformatis majoribus 2–2.5 mm longis arcuatis fortibus subulatis dimidio ultimo rubri-brunneo minoribus 1–1.7 mm longis simulantibus sed gracilioribus, midnervo infra cum aculeis simulantibus majoribus 1.6–1.8 mm longis minoribus 0.8–1.4 mm

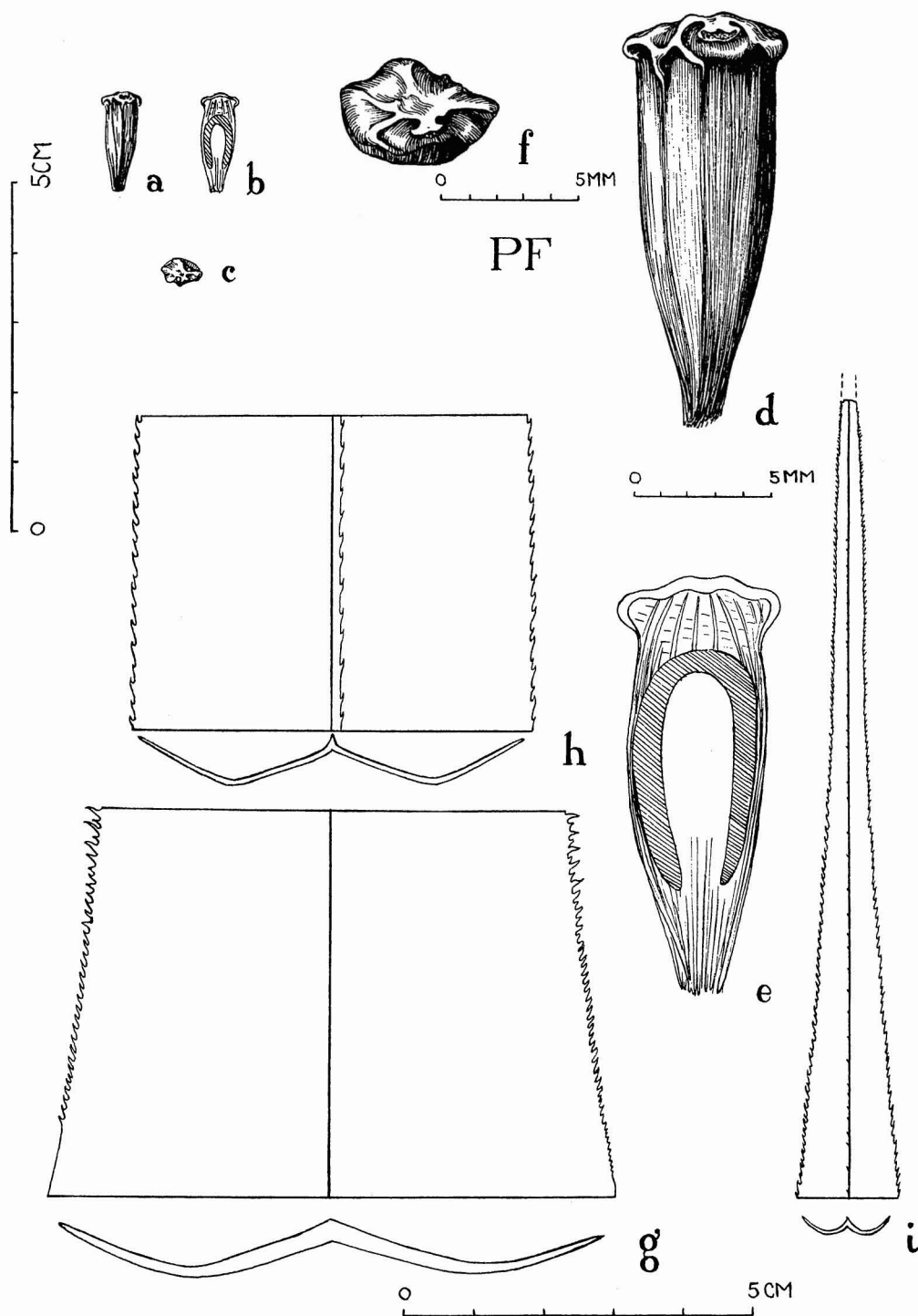


FIG. 311. *Pandanus biciliatus* St. John, from holotype. *a*, drupe, lateral view, $\times 1$; *b*, drupe, longitudinal median section, $\times 1$; *c*, drupe, apical view, $\times 1$; *d*, drupe, lateral view, $\times 4$; *e*, drupe, longitudinal median section, $\times 4$; *f*, drupe, apical view, $\times 4$; *g*, leaf base, lower side, $\times 1$; *h*, leaf middle, lower side, $\times 1$; *i*, leaf apex, lower side, $\times 1$.

longis, plicis inermibus, in apice subulato marginibus cum aculeis 0.3–1.5 mm separatis biformatis majoribus 0.6–1 mm longis arcuatis subulatis valde adscendentibus brunneis alternantibus cum minoribus 0.2–0.4 mm longis arcuatis fortibus subulatis adscendentibus brunneis, midnervo infra cum aculeis 0.2–0.5 mm longis 2–5 mm separatis arcuatis subulatis adscendentibus brunneis, infructescentia cum syncarpio solitario in bracteis multis clausis, syncarpio plerumque 42 cm longo et 8 cm diametro licet cylindrico, drupis luteis biformatis eis licet lateralibus 14–16 mm longis 3.5–4.8 mm latis 3–4.5 mm crassis oblancei-prismaticis 4–6-angulosis illis licet apicalibus 13–15 mm longis 5–6 mm latis 3–5 mm crassis et in omnibus parte $\frac{1}{8}$ – $\frac{1}{8}$ libera et in sicco parte latiori, pileo 2 mm alto marginibus rotundatis apice oblato subtruncato parte apicali $\frac{1}{3}$ – $\frac{1}{4}$ concavo et in bordo eo cum stylo galeato horizontali 0.3–0.7 mm longo osseoso luteo lucido 2–3 (–4)-lobato, stigmatibus 1.3–1.5 mm lato ligulato obscure brunneo papilloso infra galeam, endocarpio supramediali osseoso pallido vel subbrunneo ellipsoideo lateribus lateralibus 1 mm crassis intra luteis lucidis laevibus, semine 5–6 mm longo ellipsoideo, mesocarpio apicali cum fibris et membranis pallidis, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 10 m tall, much branched, with prop roots; leaves 1.49–1.74 m long, 5.5 cm wide at the middle, 6–6.6 cm wide near the base, coriaceous, above green and somewhat glaucous, below paler green and very glaucous, U-sulcate, 2-pleated, at midsection with 81 parallel secondary veins in each half, the tertiary veins not really visible, blade sword-shaped, gradually tapering to the stout, trigonous, subulate apex, this at a point about 10 cm down 6 mm wide, the base unarmed, pale, beginning at 5.5–7 cm up the margins with prickles 0.5–2.5 mm apart, of two sorts usually alternating, larger ones 1.5–3 mm long, arcuate thick subulate, reflexed, pale, with red tips, and smaller ones 0.5–1.8 mm long, deltoid or thick subulate, ascending or salient, red-tipped; the midrib below beginning at 20.5 cm with prickles 1.2–1.8 mm long, the base conic, pale, the tip subulate, reflexed, red-tipped; at midsection the margins with prickles

2–4 mm apart, of two sorts alternating, larger ones 2–2.5 mm long, arcuate strong subulate, the outer half red-brown, and smaller ones 1–1.7 mm long, similar but more slender; the nearby midrib below with similar prickles, the larger ones 1.6–1.8 mm long, the smaller ones 0.8–1.4 mm long; the pleats unarmed; on the subulate apex the margins with prickles 0.3–1.5 mm apart, of two sorts alternating, larger ones 0.6–1 mm long, arcuate subulate, strongly ascending, brown, and smaller ones 0.2–0.4 mm long, arcuate stout subulate, ascending, brown; the nearby midrib below with prickles 0.2–0.5 mm long, 2–5 mm apart, arcuate subulate, ascending, brown; infructescence with a solitary syncarp completely enveloped in numerous bracts; average syncarp 42 cm long and 8 cm in diameter, probably cylindric; drupes yellow, of two kinds, the ones that are probably lateral being 14–16 mm long, 3.5–4.8 mm wide, 3–4.5 mm thick, oblance-prismatic, 4–6-angled, the other drupes (probably apical) 13–15 mm long, 5–6 mm wide, 3–5 mm thick, and of all the $\frac{1}{8}$ – $\frac{1}{8}$ part free and when dried this wider than the contiguous parts; pileus 2 mm high, with rounded edges and a very oblate or nearly truncate top, this at the apex with $\frac{1}{3}$ – $\frac{1}{4}$ of the width occupied by a concavity from the margin of which is projected laterally the style which is a horizontal visor 0.3–0.7 mm long, bony, yellowish, shining, and 2–3 (–4)-lobed; stigma 1.3–1.5 mm wide, a broad band under the stylar visor, dark brown, papillose; endocarp supramedian, bony, pale to brownish, ellipsoid, the lateral walls 1 mm thick, within yellowish, smooth, shining; seed 5–6 mm long, ellipsoid; apical mesocarp of fibers and pale membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Papua, Woodlark I., Kulumadau, frequent in rain forest, 100 m alt, Nov. 14, 1956, *L. J. Brass* 28,746 (K). Isotypes (L, us)!

DISCUSSION: There are a number of known species of the section *Maysops* in New Guinea, but the closest relative is an undescribed species from Biak Island, Irian Barat, represented by the collection St. John 26,141.

The new epithet is formed from the Latin *bi*, twice, *ciliatus*, fringed, and is given with reference to the doubly ciliate leaf margins.

***Pandanus biformatus* sp. nov.** (sect. *Maysops*)

Fig. 312

DIAGNOSIS HOLOTYPE: Arbor 8–10 m alta, corona lata, radicibus fulturosis longis striatis et profunde sillonatis, foliis 1.3–1.5 m longis in medio 4.5 cm latis ad basem 4.2 cm latis subtiliter coriaceis supra viridibus et subglaucis infra pallidioribus et glaucis U-sulcatis 2-plicatis in sectione mediali cum 50 nervis parallelis secundariis in quoque dimidio nervis tertiis transversis in parte $\frac{3}{4}$ ultima evidentis et reticulis breviter rhombicis formantibus lamina subligulata sed in parte $\frac{1}{4}$ ultima in apice subulato crasso trigono deminuenti eo in puncto 10 cm ex apice 14 mm lato basi inermi pallida, ex 2.5–4 cm marginibus cum aculeis 1–1.8 mm longis 2–3 mm separatis subulati-deltoideis primariis subarcuatis reflexis alteris salientibus tum adscendentibus pallidis apicibus rubris, in sectione mediali marginibus cum aculeis 0.8–1 mm longis 3–5 mm separatis arcuatis subulatis valde adscendentibus apicibus rubris, in sectione 20 cm ultra media midnervo infra anguste salienti cum 2 lineis aculeorum uno ad dextram altero ad sinistram aculeis 0.2–0.3 mm longis 0.5–1 mm separatis arcuatis subulatis valde adscendentibus pallidis, in apice subulato marginibus cum aculeis 0.2–0.6 mm longis inaequalibus irregularibus subulatis adscendentibus pallidis, syncarpio solitario 23 cm longo 7.5 cm diametro cylindrico obtuse deltoideo, drupis pallide viridi-luteis biformatis eis gracilibus (lateralibus?) 19–22 mm longis 4–6 mm latis 3–4.5 mm crassis cuneatis prismaticis 5–6-angulosis parte $\frac{1}{4}$ supra libera, illis latioribus (apicalibus?) 17–18.5 mm longis 6–8 mm latis 5–7 mm crassis, pileo 1.5–2 mm alto laevi lucido lateribus rotundatis apice licet truncato sed in verite vadose in tertia centrali retuso, stylo 0.5–1 mm longo galeato ex margine concavi horizontali osseoso lucido luteo plerumque tridentato, stigmate 1–1.5 mm lato nigro papilloso, endocarpio mediali vel submediali 10 mm longo osseoso stramineo ellipsoideo cum projectione apicali setoso lateribus lateralibus 0.5–0.7 mm crassis intra laevibus lucidis, semine 6 mm longo, mesocarpio apicali fibroso et membranoso, mesocarpio basali fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 8–10 m tall, branched into a spreading crown; prop roots

few, long, deeply fluted; leaves 1.3–1.5 m long, 4.5 cm wide near the middle, 4.2 cm near the base, thin coriaceous, green and somewhat glaucous above, pale green and more glaucous beneath, U-sulcate, 2-pleated, at midsection with 50 parallel secondary veins in each half, the tertiary crossveins evident on both sides in outer $\frac{3}{4}$, forming short rhombic meshes, blade more or less ligulate, but in outer $\frac{1}{4}$ tapering into the stout trigonous, subulate apex, this at the point 10 cm down 14 mm wide, the base unarmed, pale; beginning at 2.5–4 cm up the margins with prickles 1–1.8 mm long, 2–3 mm apart, subulate-deltoid, the first one slightly arcuate reflexed, then the others salient, then others ascending, pale with reddish tips; midrib near base not observed; at midsection the margins with prickles 0.8–1 mm long, 3–5 mm apart, arcuate subulate, strongly ascending, red tipped; the midrib below narrow salient and on its ridge, pointing alternately to the two sides are prickles 0.2–0.3 mm long, 0.5–1 mm apart, arcuate subulate, strongly ascending, pale; on the subulate apex the margins with prickles 0.2–0.6 mm long, unequal, irregular, arcuate subulate, ascending, pale; the midrib below not well seen; infructescence with a solitary syncarp, probably enwrapped by numerous bracts; syncarp 23 cm long, 7.5 cm in diameter, cylindric, obscurely 3-angled; drupes pale greenish yellow, of two types, the slender and probably lateral ones 19–22 mm long, 4–6 mm wide, 3–4.5 mm thick, cuneate prismatic, 5–6-angled, upper $\frac{1}{4}$ free, the broader drupes, probably apical, 17–18.5 mm long, 6–8 mm wide, 5–7 mm thick; pileus 1.5–2 mm high, smooth, shining, rounded at the edges, then the apex appearing truncate, but actually retuse with a shallow concavity occupying about $\frac{1}{3}$ of the apex, from the margin of this protrudes laterally the style 0.5–1 mm long, bony, shining, yellowish, horizontal, ending in a mostly 3-dentate visor under which is the bandlike stigma 1–1.5 mm wide, black, papillose; endocarp median or slightly submedian, 10 mm long, bony, stramineous, ellipsoid, prolonged by an upward bristle, the lateral walls 0.5–0.7 mm thick, within smooth, shining; seed 6 mm long; apical mesocarp of numerous longitudinal fibers and pale membranes; basal mesocarp fibrous and fleshy.

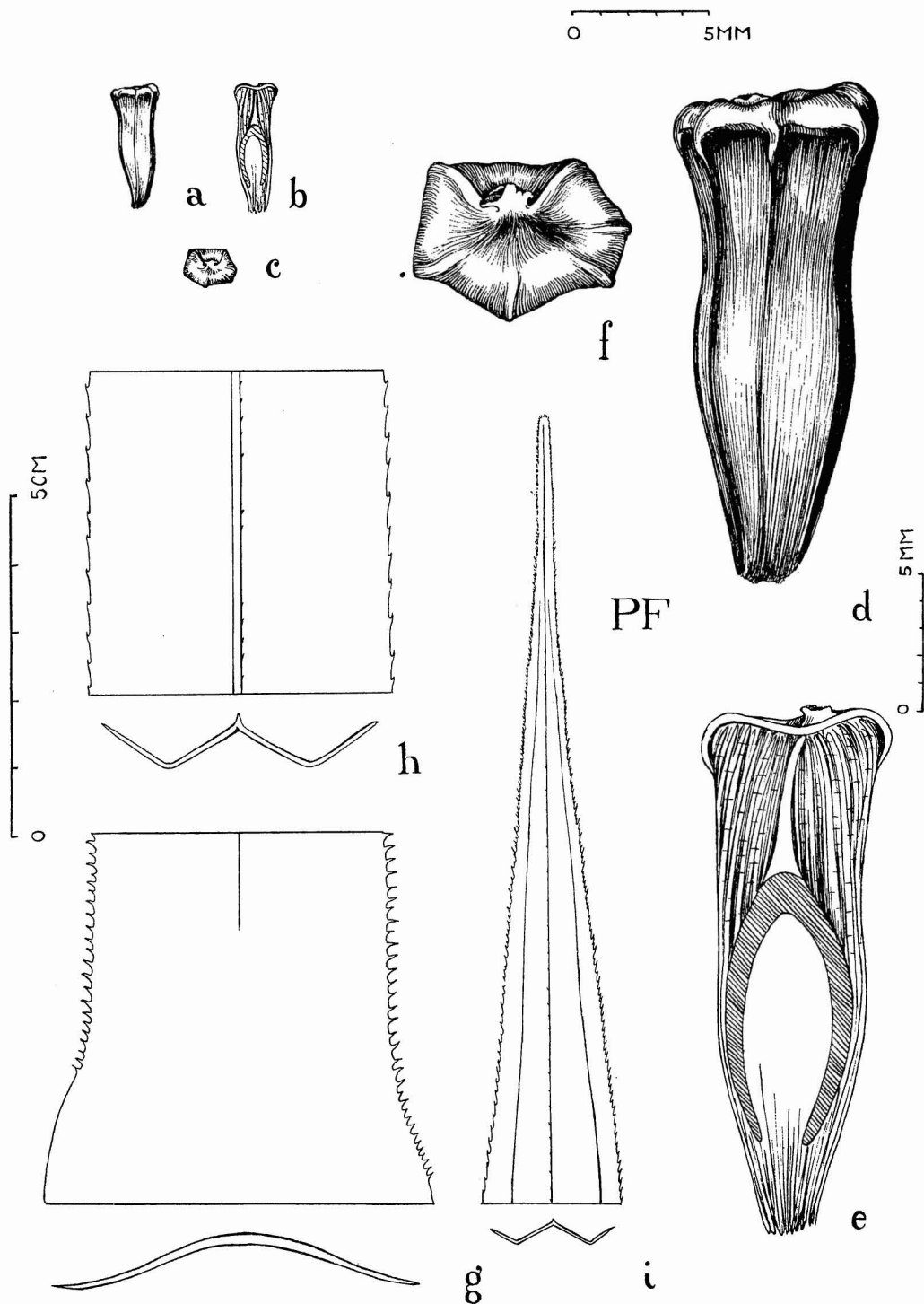


FIG. 312. *Pandanus biformatus* St. John, from holotype. *a*, drupe, lateral view, $\times 1$; *b*, drupe, longitudinal medial section, $\times 1$; *c*, drupe, apical view, $\times 1$; *d*, drupe, lateral view, $\times 4$; *e*, drupe, longitudinal median section, $\times 4$; *f*, drupe, with stigma, apical view, $\times 4$; *g*, leaf base, lower side, $\times 1$; *h*, leaf middle, lower side, $\times 1$; *i*, leaf apex, lower side, $\times 1$.

HOLOTYPE: Papua, Milne Bay District, Bini-guni Camp, Gwariu River, occasional, rain forest, 200 m alt, 2 Aug. 1953, L. J. Brass 23,765 (K).

DISCUSSION: *P. biformatus* is a member of the section *Maysops*, as is its closest relative *P. gogolensis* St. John of Australian New Guinea, a species with the drupes 23–24 mm long, the upper $\frac{1}{3}$ free; stylar visor mostly bifurcate; endocarp apex short conic; leaves 3.3 cm wide, at midsection the midrib below with prickles 0.2–0.4 mm long, 2–5 mm apart, arcuate subulate, ascending, reddish tipped. *P. biformatus* St. John of Papua has drupes 17–22 mm long, the upper $\frac{1}{11}$ free; stylar visor mostly tridentate; endocarp prolonged into a bristle to the style; leaves 4.5 cm wide, at the point 20 cm above the midsection the prickles commence on the narrow salient midrib, in alternate rows on either side, arcuate subulate, strongly ascending, pale.

The new epithet is made from the Latin, *bi-*, twice; *formatus*, formed, and is given in reference to the two different shapes of the drupes.

***Pandanus clausus* sp. nov. (sect. *Maysops*)**

Fig. 313

DIAGNOSIS HOLOTYPE: Statura radices truncus ramulique incogniti; foliis licet 2 m vel plus longis basi 7.5 cm lata coriaceis supra viridibus infra palliditer viridibus U-sulcatis 2-plicatis in puncto 33 cm e basi cum 67 nervis parallelis secundariis in quoque dimidio et in puncto 28 cm ex apice cum 60 nervis secundariis nervis tertiis nullis lamina ligulata acuta in puncto 10 cm ex apice 32 mm lato basi inermi pallida sed ex 9 cm marginibus cum aculeis 2–2.5 mm longis 1–4 mm separatis subulatis salientibus vel minime adscendentibus pallidis vel minime brunneis, midnervo infra ex 20 cm cum aculeis 1–1.5 mm longis 1–6 mm separatis compressis subulatis subrecurvatis apicibus brunescens, ad apicem marginibus et midnervo infra cum aculeis 0.7–1 mm longis crassiter subulatis arcuatis adscendentibus apicibus subbrunneis, infructescentia cum syncarpio solitario a bracteis numerosis cinctis eis plerumque subaequalibus 30–40 cm longis 9–14 cm latis lanceolatis navicularibus coriaceis duris pallidis (rosaceis?)

marginibus et midnervo infra subulati-ciliolatis, syncarpio 32 cm longo 9–10 cm diametro cylindrico, drupis lateralibus 23–27 mm longis 4–6.5 mm latis 4–5 mm crassis prismaticis 5–6-angulosis parte $\frac{1}{3}$ – $\frac{1}{6}$ supera libera, pileo 2 mm alto margine rotundato apice concavo, stylo in basi erecto tum in 90° proxime flecto et truncato circa 2 mm longo et lobis binis (vel uno) rotundatis ferrentibus et infra eas cum stigma lunato vel suborbiculari 1 mm lato brunneo papilloso, endocarpio submediali ellipsoideo osseoso palliditer brunneo cum projectione apicali graciliter conico lateribus lateralibus 0.5 mm crassis intra corrugato luteo-brunneo lucido, semine 8 mm longo anguste ellipsoideo, mesocarpio apicali cum fibris lateralibus in apice convergentibus et caverna in parte infera villosa et cum membranis albis, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Stature, roots, trunk, and branches not recorded; leaves probably 2 or more meters long, but only the bases and tips seen, the base 7.5 cm wide, thick coriaceous, above green, below pale green, U-sulcate, 2-pleated, at the point 33 cm above the base with 67 parallel secondary veins in each half, and at 28 cm from the tip with 60 veins, no tertiary crossveins, blade ligulate, acute, at the point 10 cm down from the apex 32 mm wide, the base unarmed, pale, but beginning at 9 cm the margins with prickles 2–2.5 mm long, 1–4 mm apart, subulate, salient to slightly ascending, pale to slightly brownish; the midrib below beginning at 20 cm with prickles 1–1.5 mm long, 1–6 mm apart, flattened subulate, slightly recurved, the tips brownish; near the apex the margins and midrib below with prickles 0.7–1 mm long, heavy subulate, arcuate, ascending, the tips faint brownish; infructescence with a solitary terminal syncarp in a husk of numerous closely enwrapping bracts, these mostly subequal, 30–40 cm long, 9–14 cm wide, lanceolate, navicular, coriaceous and hard, pale (apparently pinkish), the margins and midrib below subulate ciliate; syncarp 32 cm long, 9–10 cm in diameter, cylindric; lateral drupes 23–27 mm long, 4–6.5 mm wide, 4–5 mm thick, prismatic, color unknown, 5–6-angled, upper $\frac{1}{3}$ – $\frac{1}{6}$ free; pileus 2 mm high, the margin rounded, the apex concave bearing a style with

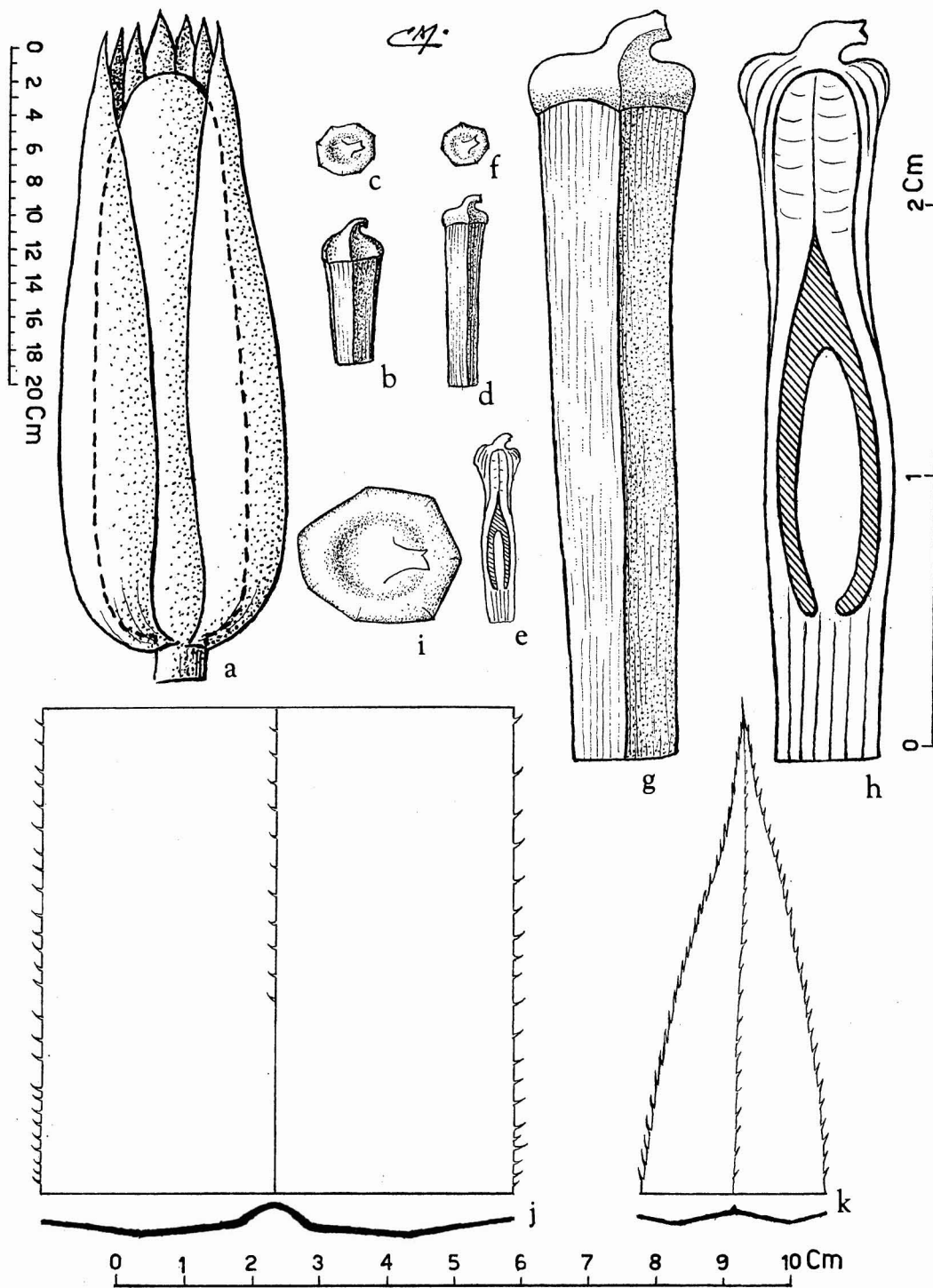


FIG. 313. *Pandanus clausus* St. John, from holotype. *a*, syncarp with husk, $\times \frac{1}{4}$; *b*, apical drupe, lateral view, $\times 1$; *c*, apical drupe, apical view, $\times 1$; *d*, lateral drupe, lateral view, $\times 1$; *e*, lateral drupe, longitudinal median section, $\times 1$; *f*, lateral drupe, apical view, $\times 1$; *g*, lateral drupe, lateral view, $\times 4$; *h*, lateral drupe, longitudinal median section, $\times 4$; *i*, lateral drupe, apical view, $\times 4$; *j*, leaf base, lower side, $\times 1$; *k*, leaf apex, lower side, $\times 1$.

an erect base, then turned at right angles towards the apex of the syncarp and truncate, about 2 mm long, ending in 2 rounded lobes (or a single obtuse tip), beneath which is the lunate or suborbicular stigma, 1 mm wide, brown, papillose; endocarp submedian, ellipsoid, bony, light brown, with an apical, slender conic projection part way towards the stigma, the lateral walls 0.5 mm thick, within corrugated, yellowish brown, shining; seed 8 mm long, narrowly ellipsoid; apical mesocarp with lateral fibers converging to the tip and the lower cavern villous and with white membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Nordöstliches Neu-Guinea, Morobe Dist., Sattelberg, hill, forest margin, 3,000 ft alt, Sept. 20, 1935, *Clemens 171* (B). Iso-type (L)!

DISCUSSION: *P. clausus* is a member of the section *Maysops*, as is its closest relative, *P. floribundus* Merr. & Perry, also of New Guinea, a species with the syncarp 45 cm long, 14 cm in diameter; drupes 2 cm long, and 3.5 mm wide. *P. clausus* has the syncarp 32 cm long, 9–10 cm in diameter; lateral drupes 2.3–2.7 cm long, and 4–6.5 mm wide.

The new epithet is from the Latin participle *clausus*, hidden, in reference to the hidden fruits.

***Pandanus concavus* sp. nov. (sect. *Maysops*)**

Figs. 314, 315, 316

DIAGNOSIS HOLOTYPE: Arbor 14 m alta, trunco 9 m alto ramoso, radicibus fulturosis 4 m altis aculeatis, foliis 1.91 (+0.02–0.04 ?) m longis in medio basique 7 cm latis coriaceis rigidis supra viridibus lucidis infra palliditer viridibus et licet glaucis U-sulcatis 2-plicatis in sectione mediali cum 59–64 nervis parallelis secundariis in quoque dimidio nervis tertiis omnino evidenti et reticulis breviter oblongis quadratis vel transversiter oblongis formantibus lamina ligulata in parte $\frac{1}{10}$ ultima in apice deminuenti (apice perdito) basi lactea vel alba et ex 6 cm marginibus cum aculeis 0.8–1.7 mm longis 2–3 mm separatis obliquiter deltoideis compressis subadscendentibus stramineis, midnervo infra in parte $\frac{3}{8}$ basali inermi, in sectione mediali marginibus cum aculeis 1–1.5 mm longis 4–7 mm separatis arcuatis crassiter subulatis com-

pressis pallidis cum apicibus rubris, in sectione licet proxima apicali marginibus et midnervo infra cum aculeis 0.5–2 mm separatis arcuatis crassiter subulatis valde adscendentibus pallidis cum apicibus subbrunneis biformatis eis majoribus 0.8–1 mm longis alternantibus cum illis minoribus 0.4–0.6 mm longis, infrutescentia cum syncarpio solitario pendulo, pedunculo circa 50 cm longo et in apice bracteis in seriebus tribus et syncarpio involutis ferrentibus, bracteis exterioribus 12 cm latis lanceolatis coriaceis navicularibus coloratis parte supera cum marginibus et midnervo infra subulati-ciliatis, syncarpio 38–47.2 cm longo 5.6–8 cm diametro cylindrico cum apicibus obtusis, drupis rubris similibus sed eis apicalibus et subapicalibus $\frac{1}{3}$ latioribus, drupis 14–15.5 mm longis 4–7 mm latis 3.5–6 mm crassis prismaticis 5–6-angulatis apice subtruncato parte $\frac{1}{4}$ supera libera lateribus subplanis deinde fibrosis, pileo 2 mm alto lateribus rotundatis apice latiter concavo minime 5–6-angulatis laevibus lucidis, stylo apicali 1.5–2 mm longo basi latiter pyramidalis centrali et proxime in 90° curvato galea osseosa straminea lucida 0.5–0.8 mm lata plerumque bidentata cum dentibus rotundatis (rare 1–3-lobata), stigmatate latiori verticali transversiter elliptico brunneo papilloso, endocarpio in parte $\frac{2}{3}$ infera ellipsoideo 8–9 mm longo apice subacuto lateribus lateralibus osseosis brunneis 0.8–1 mm crassis intra laevibus lucidis, semine 2–2.5 mm diametro ellipsoideo, mesocarpio apicali solido fibrosissimo, mesocarpio basali cum carne et fibris longitudinalibus fortibus.

DIAGNOSIS OF HOLOTYPE: Tree 14 m tall; trunk 9 m tall, then branching into a crown; prop roots 4 m tall, aculeate; leaves 1.91 (+0.02–0.04 ?) m long, 7 cm wide at middle and base, coriaceous, rigid, above medium green, shiny, below pale green and apparently glaucous, U-sulcate, 2-pleated, at midsection with 59–64 parallel secondary veins in each half, the tertiary crossveins visible nearly throughout, forming short oblong, square, or transversely oblong meshes, blade ligulate, in outer $\frac{1}{10}$ narrowing to the apex (this probably acute, but lost in ours), base creamy or whitish, beginning 6 cm up the margins with prickles 0.8–1.7 mm long, 2–3 mm apart, oblique deltoid, compressed, slightly ascending, stramineous;

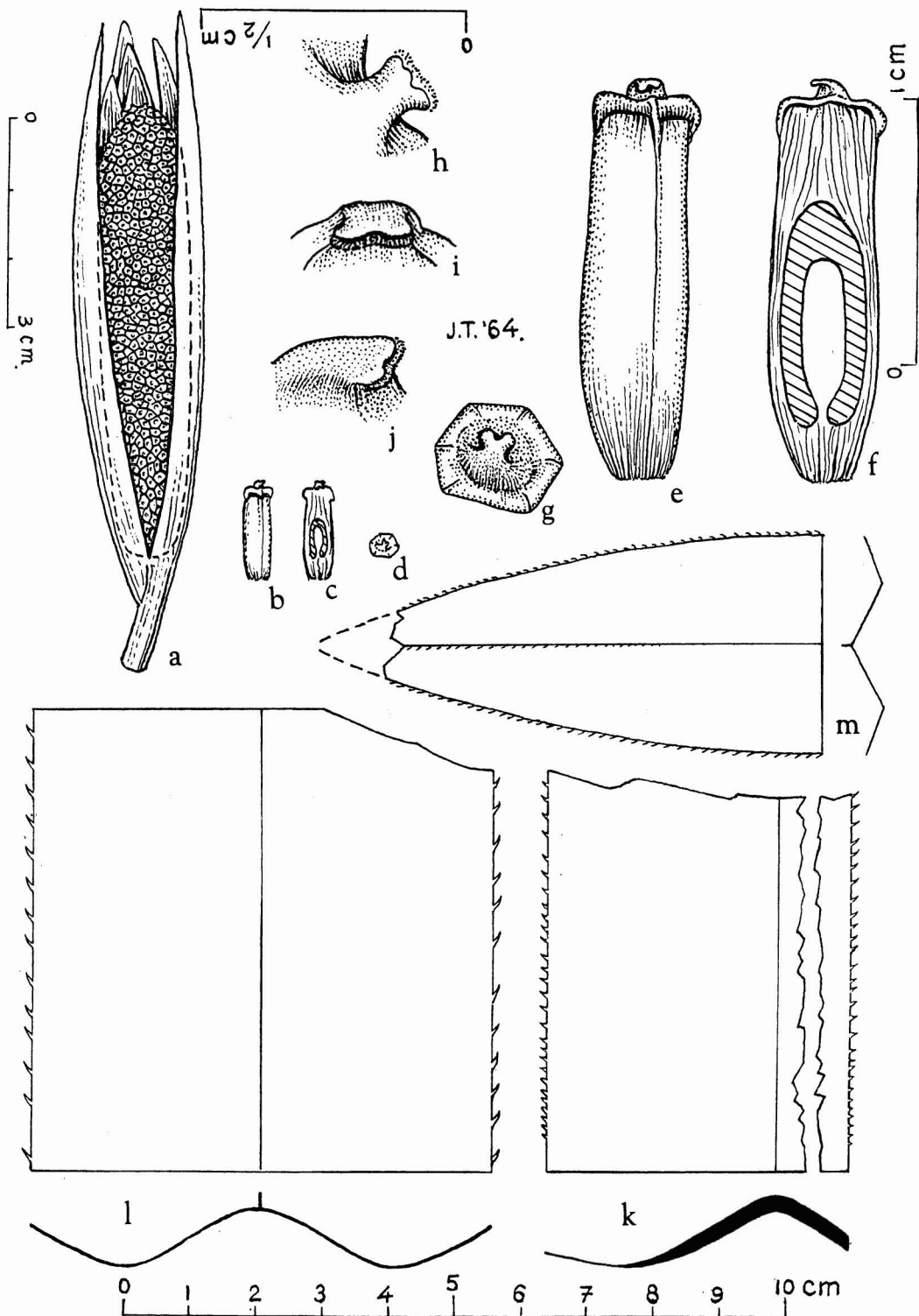


FIG. 314. *Pandanus concavus* St. John, from holotype. *a*, syncarp and bracts, $\times \frac{1}{2}$; *b*, drupe, lateral view, $\times 1$; *c*, drupe, longitudinal median section, $\times 1$; *d*, drupe, apical view, $\times 1$; *e*, drupe, lateral view, $\times 4$; *f*, drupe, longitudinal median section, $\times 4$; *g*, drupe, apical view, $\times 4$; *h*, style and stigma, apical view, $\times 8$; *i*, *j*, style and stigma, oblique view, $\times 8$; *k*, half of leaf base, lower side, $\times 1$; *l*, leaf middle, lower side, $\times 1$; *m*, leaf apex, lower side, $\times 1$.



FIG. 315. *Pandanus concavus* St. John, holotype, lateral view of syncarp and peduncle. Photo by C. Kalkman.

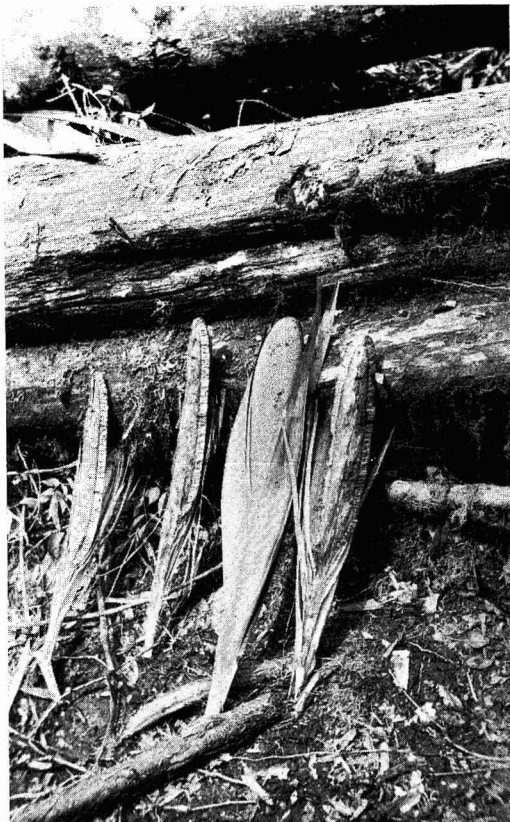


FIG. 316. *Pandanus concavus* St. John, lateral view of syncarps. Photo by C. Kalkman.

the midrib below unarmed for the lower $\frac{2}{3}$ s; at midsection the margins with prickles 1–1.5 mm long, 4–7 mm apart, arcuate thick subulate, compressed, pale, with red tips; towards the apex the margins and midrib with prickles 0.5–2 mm apart, arcuate thick subulate, strongly ascending, pale with brownish tips, of two sorts alternating, the large ones 0.8–1 mm long, the small ones 0.4–0.6 mm long; infructescence with a solitary, pendulous syncarp; peduncle about 50 cm long, at the apex bearing imbricate bracts in 3 tiers that overtop the syncarp; outer bracts 12 cm wide, lanceolate, coriaceous, navicular, colored, in the upper part the margins and midrib below subulate ciliate; syncarp 38–47.2 cm long, 5.6–8 cm in diameter, cylindric with rounded ends; drupes red, all similar, but the apical and subapical ones $\frac{1}{3}$ broader, though of equal length to the numer-

ous lateral ones; drupes 14–15.5 mm long, 4–7 mm wide, 3.5–6 mm thick, prismatic, 5–6-angled, the apex appearing truncate, upper $\frac{1}{2}$ free, the sides more or less flattened, becoming fibrous; pileus 2 mm high, the sides rounded, the top broadly concave, perceptibly 5–6-angled, smooth, shining; style apical 1.5–2 mm long, with broad pyramidal base arising from the center of the concavity, this curved proximally to a right angle to the marginal visor, bony, stramineous, shining, 0.5–0.8 mm wide, mostly bidentate with rounded marginal teeth, less commonly 1–3-lobed; stigma slightly wider than the visor and vertical under it, transversely elliptic, brown, papillose; endocarp in lower $\frac{2}{3}$, ellipsoid, 8–9 mm long, the apex subacute, the lateral walls bony, brown, 0.8–1 mm thick, within smooth, shining; seed 2–2.5 mm in diameter, ellipsoid; apical mesocarp a solid tissue,

densely fibrous; basal mesocarp with flesh and heavy longitudinal fibers.

HOLOTYPE: Nederlands Nieuw-Guinea, Star Mts., Mt. Antares, 1 km. E of junction of Bon and Minam Rivers, primary forest, 1,500 m alt, July 13, 1959, *C. Kalkman 4,416* (L). Isotypes (A, BM)!

DISCUSSION: *P. concavus* is a member of the section *Maysops*, as is its closest relative, *P. floribundus* Merr. & Perry, of the Palmer River, Papua, a species with the syncarp 14 cm in diameter; drupes 20–22 mm long, 3–5 mm wide, the apex purple black; pileus truncate; style 1 mm long; endocarp 11 mm long, the walls 0.4 mm thick; leaves 3 m long, with 72 parallel secondary veins at midsection in each half, and beginning at 9–14 cm from the base the margins with prickles 1–2.5 mm long, 1–3 mm apart, broad subulate, ascending, brownish. *P. concavus* has the syncarp 5.6–8 cm in diameter; drupes 14–15.5 mm long, 4–7 mm wide, wholly red; pileus concave; style 1.5–2 mm long; endocarp 8–9 mm long, the walls 0.8–1 mm thick; and the leaves 2 m long, with 59–64 parallel secondary veins at midsection in each half, and beginning at 6 cm up the margins with prickles 0.8–1.7 mm long, 2–3 mm apart, oblique, deltoid, compressed, slightly ascending, stramineous.

The new epithet is the Latin adjective *concavus*, concave, and is given with reference to the form of the apex of the drupes.

***Pandanus galeatus* sp. nov. (sect. *Maysops*)**

Figs. 317, 318

DIAGNOSIS HOLOTYPE: Arbor 20 m vel plus alta ramosa, radicibus fulturosis crassis erectis congregatis, foliis 1.5–1.6 m longis in medio 10.7 cm latis proxima basem 11.2 cm coriaceis supra viridibus infra palliditer viridibus U-sulcatis 2-plicatis in sectione mediali cum 79 nervis parallelis secundariis in quoque dimidio nervis tertiis in paginis ambis evidentis et reticulis breviter oblongis formantibus lamina ligulata (apice perditio) basi inermi pallida ex 5–5.5 cm marginibus cum aculeis 2–2.5 mm longis 2–4 mm separatis crasse subulatis stramineis infimis paene reflexis proximis subreflexis deinde sequentibus subadscendentibus, midnervo in-

fra ex 17 cm cum aculeis 0.5–0.7 mm longis 4–7 mm separatis subulatis hamatis reflexis stramineis, in sectione mediali marginibus cum aculeis 0.7–1 mm longis 5–10 mm separatis subulatis arcuatis validis valde adscendentibus stramineis, midnervo infra cum aculeis simulantibus gracilioribus, infructescentia pendenti in pedunculo brevi cum syncarpio solitario, eo 38 cm longo 13 cm diametro subtrilaterato rubro et carnosio cum drupis numerosissimis, eis 43–45 mm longis 3.5–5 mm latis (–6 in gemine) 2.5–3.5 mm crassis anguste prismaticis sed supra incrassatis 5–6-angulatis parte $\frac{1}{5}$ supera libera, pileo oblato convexo minime anguloso laevi lucido, stylo 0.3–0.5 mm alto cylindrico deinde in angulo recto flecto plano horizontali et 1–1.5 mm projectenti in galea bifida (vel integra) cum lobis latis obtusis, stigmatate 0.6–0.8 mm lato transverse elliptico brunneo papilloso in apice verticali vel infra galea impendenti adfigito, endocarpio in parte $\frac{1}{5}$ infera et 7–8 mm longo osseoso obscure brunneo ellipsoideo cum apice acuto lateribus lateralibus 0.5–0.6 mm crassis intra laevibus lucidisque, mesocarpio apicali 25 mm longo cum fibris longitudinalibus pluribus et membranis pallidis, mesocarpio basali parvo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 20 m or more tall, branched; prop roots thick, erect, crowded; leaves 1.5–1.6 m long, 10.7 cm wide at the middle, 11.2 cm near the base, coriaceous, green above, pale green below, U-sulcate, 2-pleated, at midsection with 79 parallel secondary veins in each half, the tertiary crossveins visible on both sides, forming short oblong meshes, the blade ligulate (in ours the apex lost), the base unarmed, pale, beginning at 5–5.5 cm up the margins with prickles 2–2.5 mm long, 2–4 mm apart, thick subulate, stramineous, the lowest slightly reflexed, the next salient, then at length the next ones somewhat ascending; the midrib below beginning at 17 cm up with prickles 0.5–0.7 mm long, 4–7 mm apart, hamate subulate, reflexed, stramineous; at midsection the margins with prickles 0.7–1 mm long, 5–10 mm apart, arcuate stout subulate, strongly ascending, stramineous; the midrib below with similar but more slender prickles; infructescence “pendent on short peduncle,”

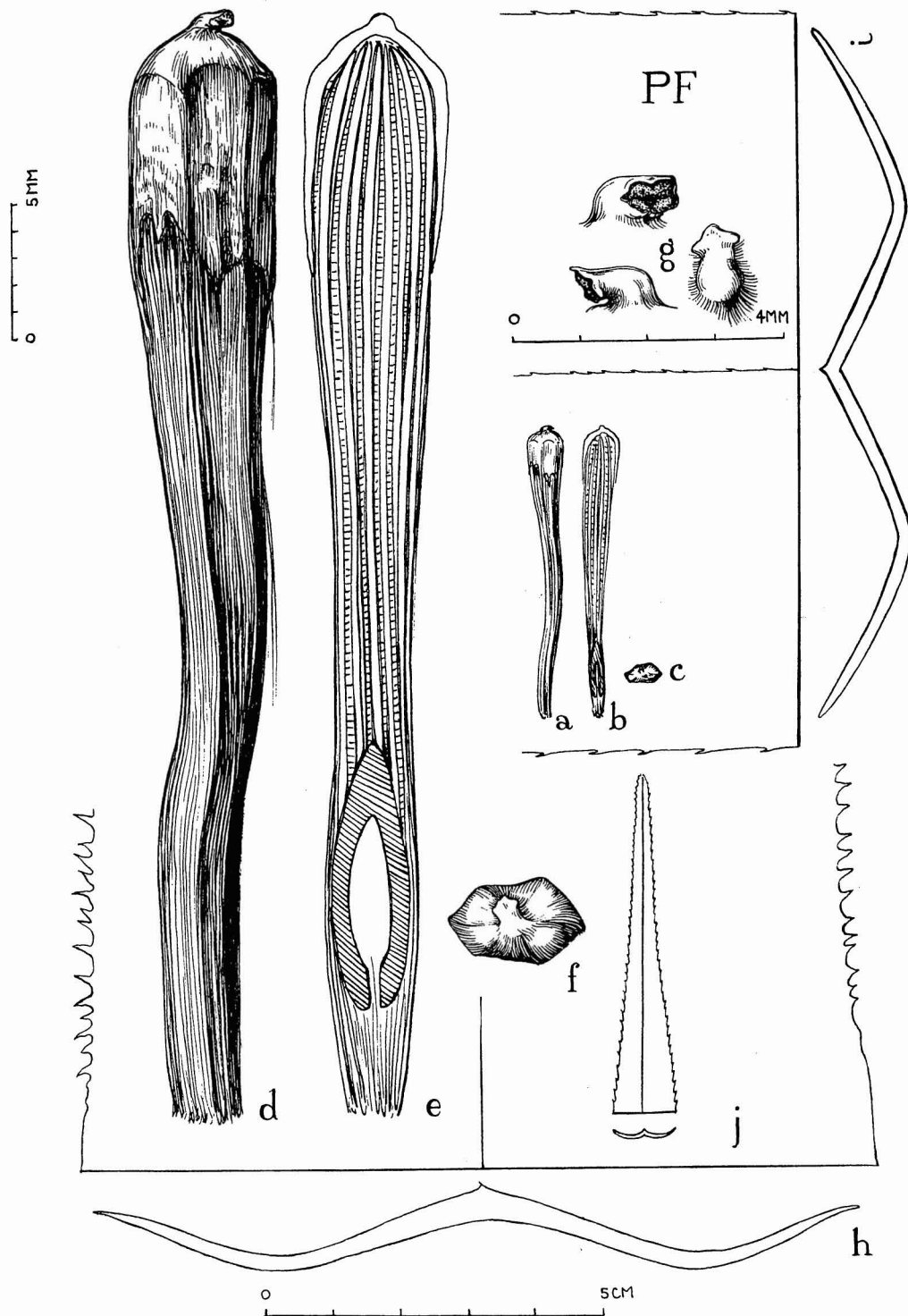


FIG. 317. *Pandanus galeatus* St. John, from holotype. *a*, drupe, lateral view, $\times 1$; *b*, drupe, longitudinal median section, $\times 1$; *c*, drupe, apical view, $\times 1$; *d*, drupe, lateral view, $\times 4$; *e*, drupe, longitudinal median section, $\times 4$; *f*, drupe, apical view, $\times 4$; *g*, style and stigma, lateral and apical views, $\times 10$; *h*, leaf base, lower side, $\times 1$; *i*, leaf middle, lower side, $\times 1$; *j*, leaf apex, lower side, $\times 1$.

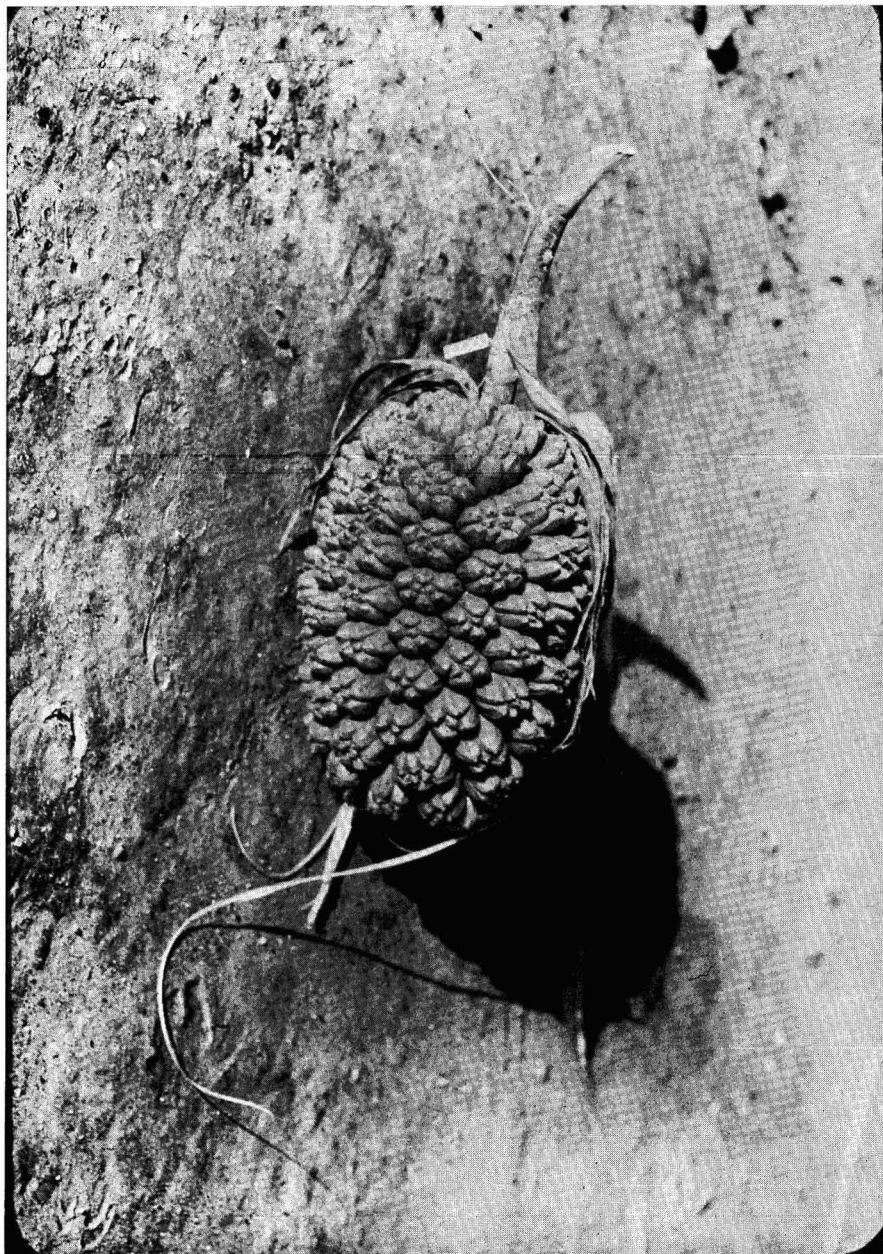


FIG. 318. *Pandanus alatus* St. John, holotype, lateral view of syncarp. Photo by L. J. Brass.

with a solitary syncarp, this 38 cm long, 13 cm in diameter, somewhat 3-sided, red and fleshy, bearing a multitude of drupes, these 43–45 mm long, 3.5–5 mm wide (–6 in a double), 2.5–3.5 mm thick, narrowly prismatic, but en-

larging slightly upward towards the pileus, 5–6-angled, upper $\frac{1}{15}$ free; pileus 1.5 mm high, low convex, weakly angled, smooth, shining; style 0.3–0.5 mm high, cylindric, then bent at right angles, flat, horizontal, and projecting 1–

1.5 mm to a bifid (or entire) visor with broad obtuse lobes; stigma 0.6–0.8 mm wide, transversely elliptic, brown, papillose, on the vertical or overhanging apex under the visor; endocarp in lower $\frac{1}{3}$, and 7–8 mm long, bony, dark brown, ellipsoid with an acute apex, the lateral walls 0.5–0.6 mm thick, within smooth, shining; apical mesocarp 25 mm long, with several longitudinal fibers and pale membranes; basal mesocarp scant, fibrous and fleshy.

HOLOTYPE: Papua, D'Entrecasteaux Is., Goodenough I., heavily mossed forest, east slope, plentiful in gullies, 1,600 m alt, 22 Oct. 1953, L. J. Brass 24,885 (K). Isotype (A)!

DISCUSSION: *P. galeatus* is a member of the section *Maysops*, as is its closest relative, an unpublished species based on St. John 26,112, from Sorong, Irian Barat, a species with the syncarp 20 cm in diameter; drupes 40 mm long; pileus 5 mm high; endocarp lead-colored; and the leaves 3.25 m long, 8.5 cm wide. *P. galeatus* differs by having the syncarp 13 cm in diameter; drupes 43–45 mm long; pileus 1.5 mm high; endocarp dark brown; and the leaves 1.5–1.6 m long, 10.7 cm wide.

The new epithet is the Latin adjective *galeatus*, with a visor, and is given with allusion to the visor formed by the edge of the style over the stigma.

***Pandanus luteus* sp. nov. (sect. *Maysops*)**

Figs. 318, 319

DIAGNOSIS HOLOTYPE: Arbor 10–12 m alta, corona lata, radicibus fulturosis multis erectis, foliis 1.82 (+0.04–0.06?) m longis in medio 7.2 cm latis ad basem 6 cm latis supra obscure viridibus lucidis infra palliditer viridibus et subglaucis crassiter coriaceis rigidis U-sulcatis 2-plicatis in sectione mediali cum 75 nervis parallelis secundariis in quoque dimidio nervis tertiis paene visis lamina plus minusve gladiata in parte $\frac{1}{3}$ ultima in apice trigono subulato gracili deminuenti eo in puncto circa 10 cm ex apice 4 mm lato basi inermi pallida, ex 10 cm marginibus cum aculeis 0.6–1.3 mm longis 1–3 mm separatis primis obliquiter deltoideis tum alteris deltoideis arcuatis subulatis adscendentibus apicibus brunneis, ex 25 cm midnervo infra cum aculeis gracilibus sed omnibus perditis, in sec-

tione mediali marginibus cum aculeis 2–5 mm separatis biformatis alternantibus majoribus 1.5–2 mm longis crassiter subulatis subrectis valde adscendentibus apicibus brunneis sed illis minoribus 0.5–1 mm longis simulantibus, midnervo infra cum aculeis fragilibus 0.2–0.4 mm longis 1.5–3 mm separatis arcuatis subulatis adscendentibus brunneis, in apice marginibus cum serrulis 0.2–0.4 mm longis 0.5–1 mm separatis brunneis majoribus minoribusque plus minusve alternantibus, midnervo infra cum aculeis 0.3–0.5 mm longis 1–2 mm separatis subulatis arcuatis brunneis, syncarpio 35 cm longo 10.5 cm diametro solitario pendenti subcylindrico obtuse trigono licet in bracteis multis involutis, drupis 13.5–15 mm longis 5–6.5 mm latis 4–5.5 mm crassis prismaticis luteis parte $\frac{1}{3}$ supera libera, pileo 2 mm alto laevi lucido cum marginibus subrotundatis apice licet truncato sed in verite retuso cum concavitate in dimidio centrali et in centro cum projectione conico quam margine 0.5–1 mm elevato tum curvato et galea 0.2–0.3 mm longa horizontali breviter bifida vel trifida supra stigmatem 0.5–0.6 mm latum transverse ellipticum nigrum papillosum, endocarpio mediali ellipsoideo osseoso brunneo lateribus lateralibus 1–1.3 mm crassis intra laevibus lucidis, semine 5 mm longo anguste ellipsoideo, mesocarpio apicali denso medullosa et fibroso, mesocarpio basali in lateribus fibroso et carnosio in centro membranoso.

DIAGNOSIS OF HOLOTYPE: Tree 10–12 m tall, widely branched; prop roots numerous, upright; leaves 1.82 (+0.04–0.06?) m long, 7.2 cm wide near the middle, 6 cm near the base, above dark shiny green, below pale green and somewhat glaucous, thick coriaceous, rigid, U-sulcate, 2-pleated, at midsection with 75 parallel secondary veins in each half, the tertiary veins scarcely perceptible, blade more or less sword-shaped, in outer $\frac{1}{3}$ tapering into the slender trigonous subulate apex, this at a point about 10 cm down, 4 mm wide, the base unarmed, pale; beginning at 10 cm up the margins with prickles 0.6–1.3 mm long, 1–3 mm apart, oblique deltoid, then the next ones arcuate subulate deltoid, ascending, brown-tipped; the midrib below beginning at 25 cm up with fine prickles, but all broken off and lost; at mid-

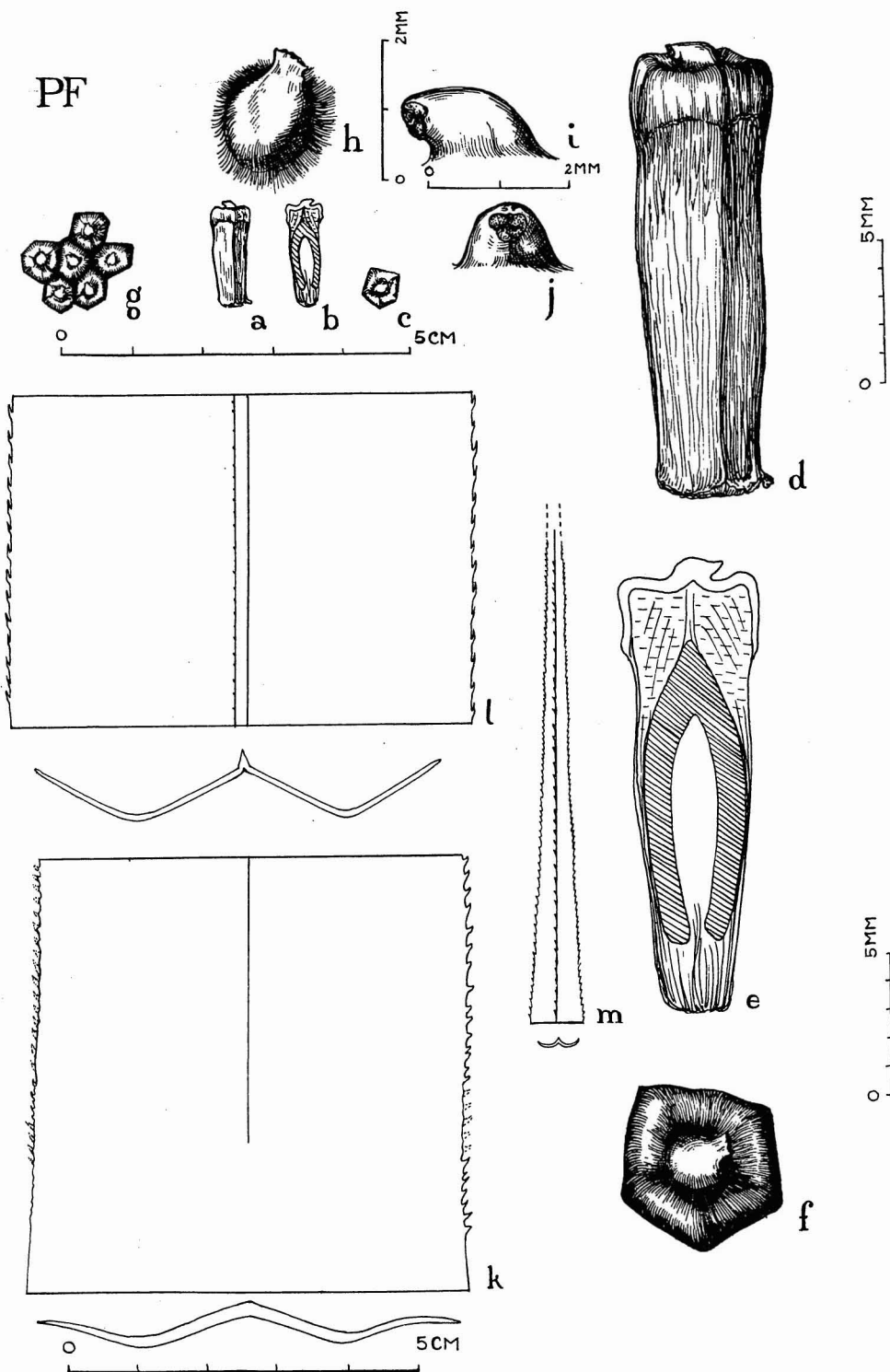


FIG. 319. *Pandanus luteus* St. John, from holotype. *a*, drupe, lateral view, $\times 1$; *b*, drupe, longitudinal median section, $\times 1$; *c*, drupe, apical view, $\times 1$; *d*, drupe, lateral view, $\times 4$; *e*, drupe, longitudinal median section, $\times 4$; *f*, drupe, apical view, $\times 4$; *g*, drupe, apical view, $\times 1$; *h*, style and stigma, apical view, $\times 10$; *i*, style and stigma, lateral view, $\times 10$; *j*, stigma, face view, $\times 10$; *k*, leaf base, lower side, $\times 1$; *l*, leaf middle, lower side, $\times 1$; *m*, leaf apex, lower side, $\times 1$.



FIG. 320. *Pandanus daymanensis* St. John, from holotype. Photo by L. J. Brass.

section the margins with prickles 2–5 mm apart, of two sorts alternating, the larger ones 1.5–2 mm long, thick subulate, nearly straight, strongly ascending, brown-tipped; the smaller ones 0.5–1 mm long, similar; the nearby midrib below with fragile prickles 0.2–0.4 mm long, 1.5–3 mm apart, arcuate subulate, ascending, brownish; on the subulate apex the margins with serrations 0.2–0.4 mm long, 0.5–1 mm apart, more or less alternately large and small, brown; the midrib below with prickles 0.3–0.5 mm long, 1–2 mm apart, arcuate subulate, brown; syncarp 35 cm long, 10.5 cm in diameter, solitary, pendent, subcylindric, bluntly 3-angled, probably enwrapped by numerous bracts; drupes 13.5–15 mm long, 5–6.5 mm wide, 4–5.5 mm thick, prismatic, yellow, upper $\frac{1}{2}$ free; pileus 2 mm high, smooth, shining, the edges somewhat rounded and the apex appearing truncate, but actually with a deep con-

cavity occupying more than half the area, and in its center a conical boss rising 0.5–1 mm above the rim and curving out to bear the horizontal stigmas forming a visor 0.2–0.3 mm long, shortly bifid or trifid; under its rim is the stigma 0.5–0.6 mm wide, transversely elliptic, blackish, papillose; endocarp median, ellipsoid, bony, brown, the lateral walls 1–1.3 mm thick, within smooth, shining; seed 5 mm long, narrowly ellipsoid; apical mesocarp a solid tissue of many fibers and pith; basal mesocarp membranous up the center, fibrous and fleshy up the sides.

HOLOTYPE: Papua, Goodenough I., east slopes, mossy oak forest, 1,600 m alt, 8–15 Oct. 1953, L. J. Brass 24,732 (K).

DISCUSSION: *P. luteus* is a member of the section *Maysops*, as is its closest relative, *P. microdontus* Merr. & Perry, a species with the drupes 19–21 mm long, 3–4 mm wide, pink, the upper $\frac{1}{10}$ free; style excentric; endocarp walls 0.3 mm thick; leaves 2.1–3 m long, 7.5–8.5 cm wide, with 67 parallel secondary veins at midsection on each side, the blade abruptly acute and at the point 10 cm down from the apex 29 mm wide, at midsection the margins with uniform prickles 1–1.3 mm long, appressed ascending. *P. luteus* has its drupes 13.5–15 mm long, 5–6.5 mm wide, yellow, the upper $\frac{1}{2}$ free; style apical; endocarp walls 1–1.3 mm thick; leaves about 1.8 m long, 7.2 cm wide, with 75 parallel secondary veins at midsection on each side, the blade in outer $\frac{1}{2}$ tapering into the slender subulate apex, this at the point about 10 cm down 4 mm wide, at midsection the margins with prickles 2–5 mm apart, of two sorts alternating, the larger ones 1.5–2 mm long, strongly ascending.

The new epithet is the Latin adjective *luteus*, yellow, and is chosen with reference to the color of the drupes.

Pandanus daymanensis sp. nov. (sect. *Microstigma*)

Figs. 320, 321

DIAGNOSIS HOLOTYPE: Planta acaulescens, foliis 2.1–2.3 m longis proxima medium 5.4–6.2 cm latis proxima basem 4.7 cm latis graciliter subcoriaceis multis debilibus supra et infra palliditer viridibus U-sulcatis 2-plicatis in sec-

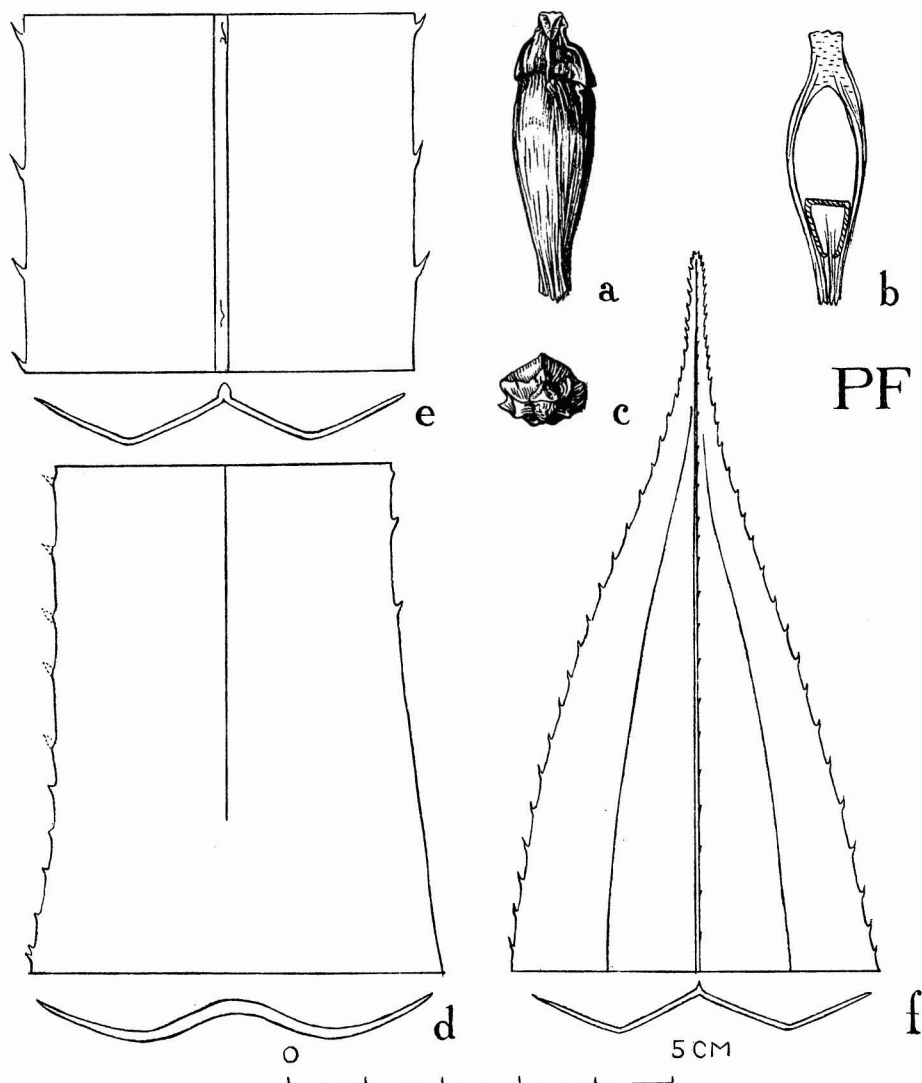


FIG. 321. *Pandanus daymanensis* St. John, from holotype. *a*, drupe, lateral view, $\times 1$; *b*, drupe, longitudinal median section, $\times 1$; *c*, drupe, apical view, $\times 1$; *d*, leaf base, lower side, $\times 1$; *e*, leaf middle, lower side, $\times 1$; *f*, leaf apex, lower side, $\times 1$.

tione mediali cum 37 nervis parallelis secundariis in quoque dimidio nervis tertiis obscuris sed proxima apicem reticulis transverse oblongis formantibus laminis subligulatis abrupte in apice acuto vel subulato trigono 2 cm longo contractis apice in puncto 10 cm ex apice 50 mm lato basi inermi palliditer rubri marginibus ex 15 cm cum aculeis 1.5–2.5 mm longis 6–11 mm separatis subulati-deltoides salientibus vel subadscendentibus stramineis cum apicibus brun-

neis, midnervo per partem $\frac{2}{3}$ inferam inermi, in sectione mediali marginibus cum aculeis 2.5–3 mm longis 11–18 mm separatis rectis graciliter subulatis subadscendentibus pallidis cum apicibus brunneis, ad apicem plicis supra cum serrulis 0.2–0.5 mm longis 4–18 mm separatis pallidis cum apicibus brunneis, in apice subulato marginibus et midnervo infra cum aculeis 0.4–0.7 mm longis 1.5–4 mm separatis subulatis adscendentibus brunneis, syncarpio solitario

pendenti 13 cm longo 9.5 cm diametro ovoideo, drupis 32–37 mm longis 10–12 mm latis 8–11 mm crassis oblanceoloideis compressis brunneis apice viridi 5–6-angulatis parte $\frac{1}{4}$ supera libera, pileo 7–8 mm alto semiorbiculari acute 5–6-angulato laevi lucido cum rostro 3–4 mm alto, stigmate 3.5–5.3 mm lato latiter cordatireniformi laterali palliditer brunneo papilloso, endocarpio in parte $\frac{1}{3}$ infera et 7 mm longo obconico osseoso pallido lateribus lateralibus 0.2 mm crassis intra subluteis laevibus lucidis, semine 4 mm diametro, mesocarpio apicali caverna 15 mm longa formanti, mesocarpio basali fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Plant acaulescent; leaves 2.1–2.3 m long, 5.4–6.2 cm wide near the middle, 4.7 cm near the base, thin subcoriaceous, numerate, weak, pale green above and below, U-sulcate, 2-pleated, at midsection with 37 parallel secondary veins in each half, the tertiary veins obscure, but seen near the apex, forming transverse oblong meshes, the blade nearly ligulate, abruptly contracted to an acute tip or to a 2 cm long trigonous subulate apex, the tip at the point 10 cm down 50 mm wide, the base unarmed, pinkish, the margins beginning at 15 cm from the base with prickles 1.5–2.5 mm long, 6–11 mm apart, subulate deltoid, salient to subsacceding, stramineous with brown tips; the midrib below unarmed for the lower $\frac{2}{3}$; at midsection the margins with prickles 2.5–3 mm long 11–18 mm apart, slender straight subulate, slightly ascending, pale with brown tips; on the subulate apex the margins and midrib below with prickles 0.4–0.7 mm long, 1.5–4 mm apart, subulate, ascending, brown; the pleats above towards the apex with serrulations 0.2–0.5 mm long, 4–18 mm apart, pale with brown tips; syncarp solitary, pendent, 13 cm long, 9.5 cm in diameter, ovoid; drupes 32–37 mm long, 10–12 mm wide, 8–11 mm thick, oblanceoloid, compressed, dull brown with a green apex, 5–6-angled, upper $\frac{1}{4}$ free; pileus 7–8 mm high, semiorbicular in profile, sharply 5–6-angled, smooth, shining, with a short, broad rostrum 3–4 mm high; stigma 3.5–5.3 mm wide, broad cordate reniform, lateral on the vertical side of the rostrum, pale brown, papillose; endocarp in lower $\frac{1}{3}$ and 7 mm long, obconic, bony, pale, the lateral walls

0.2 mm thick, within yellowish, smooth, shining; seed 4 mm in diameter; apical mesocarp an ellipsoid cavern 15 mm long; basal mesocarp fibrous and fleshy.

HOLOTYPE: Papua, Milne Bay Dist., N slopes of Mt. Dayman, Maneau Range, undergrowth of a rain forest gully, 700 m alt, 16–23 July 1953, L. J. Brass 23,459 (K). Isotype (A)!

DISCUSSION: *P. daymanensis* is a member of the section *Microstigma*, as is its relative, a rather remote one, *P. sattelbergensis* St. John, of Morobe, NE New Guinea, a species with the drupes 3–4.2 mm wide, narrowly oblong, the upper $\frac{1}{3}$ free; pileus 4–5 mm high, pyramidal to the truncate apex; stigma 0.7–1 mm wide; endocarp in lower $\frac{1}{3}$; and the leaf blade at midsection with the margins having prickles 1–1.2 mm long, 8–16 mm apart, stout subulate, strongly ascending, pale. *P. daymanensis* has the drupes 10–12 mm wide, oblanceoloid, the upper $\frac{1}{4}$ free; pileus 7–8 mm high, semiorbicular; stigma 3.5–5.3 mm wide; endocarp in lower $\frac{1}{3}$; leaf blade at midsection with the margins having prickles 2.5–3 mm long, 11–18 mm apart, slender straight subulate, strongly ascending, brown-tipped.

The new epithet is coined from the name of the type locality, Dayman, with the Latin place suffix, *-ensis*, thus forming an adjective, meaning from the Dayman place.

Pandanus paludosus Merr. & Perry, J. Arnold Arbor. 20: 172–173, pl. 1, fig. 16, 16a, b, 1939; 21: 169, 1940 (sect. *Microstigma*)

Fig. 322

EXPANDED DIAGNOSIS OF HOLOTYPE: Tree 5–7 m tall; “stem much branched, supported on prop roots, both with a few very small blunt prickles”; branchlets 13–16 mm in diameter; leaves 63–83 (+1–3?) cm long, near the base 18–26 mm wide, at outer $\frac{2}{3}$ s point 44–69 mm wide, chartaceous, widely U-sulcate, and with 2 low rounded pleats, at midsection with 38–39 parallel secondary veins in each half, the tertiary crossveins visible throughout and below prominent, forming short oblong or square meshes, blade linear-oblanceolate, the apex broad but shortly narrowed into a trigonous subulate tip 15 (+10–30?) mm long, the base unarmed, ap-

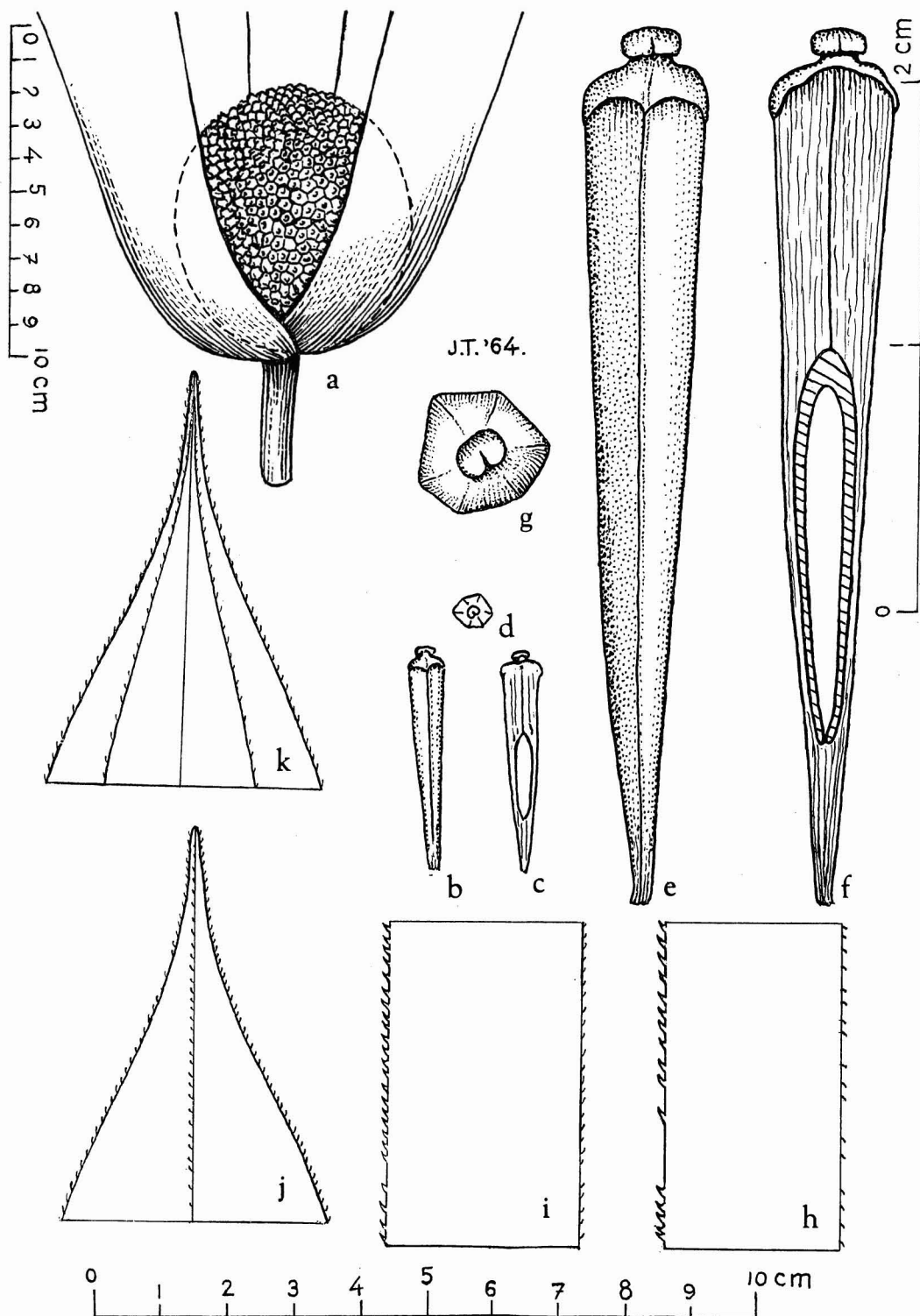


FIG. 322. *Pandanus paludosus* Merr. & Perry, from isotype. *a*, syncarp, $\times \frac{1}{2}$; *b*, drupe, lateral view, $\times 1$; *c*, drupe, longitudinal median section, $\times 1$; *d*, drupe, apical view, $\times 1$; *e*, drupe, lateral view, $\times 4$; *f*, drupe, longitudinal median section, $\times 4$; *g*, drupe, apical view, $\times 4$; *h*, half of leaf base, lower side, $\times 1$; *i*, half of leaf middle, lower side, $\times 1$; *j*, half of leaf apex, lower side, $\times 1$; *k*, half of leaf apex, upper side, $\times 1$.

parently pinkish; beginning 3 cm up the margins with serrulations 0.5–1 mm long, 1–3 mm apart, compressed, distinct or doubled or fused into a band, stramineous; further up the prickles 1–1.8 mm long, 2–4 mm apart, arcuate subulate, compressed, stramineous; the midrib below beginning at 10 cm up with prickles 0.4–0.5 mm long, 2–4 mm apart, arcuate slender subulate, reflexed, stramineous; at midsection the margins with prickles 0.4–0.7 mm long, 1–3 mm apart, arcuate thick subulate, ascending, stramineous; the nearby midrib below with prickles 0.1–0.3 mm long, 1.5–3 mm apart, arcuate subulate, ascending, stramineous; near the apex the margins and midrib below with prickles 0.5–0.8 mm long, 0.5–2 mm apart, arcuate slender subulate, ascending, pale; the pleats above near the apex with prickles 0.4–0.6 mm long, 2–3 mm apart, arcuate stout subulate, rigid, ascending, brownish; infructescence lateral ascending or nearly so, with a solitary syncarp; peduncle 10–13 cm long, 7–10 mm in diameter, trigonous, clothed with several green leafy bracts, the lowest one 40 cm long, 6 cm wide, linear-oblongate, the upper margins and midrib serrulate; the inner bracts progressively smaller and narrower; syncarp 8–10 cm long, 7–9 cm in diameter, broadly ellipsoid, slightly 3-sided, bearing 900–1,360 drupes, these 30–34 mm long, 4–6 mm wide, 3–4 mm thick, white, prismatic-clavate, apex convex, 5–6-angled, upper $\frac{1}{10}$ free, lower sides flat; pileus 3 mm high, oblate pyramidal, 5–6-angled, the surface nearly smooth, shining; style none; stigma 2.5–3 mm wide, apical, horizontal, subcircular, brown, papillose; endocarp in lower $\frac{2}{3}$ and 13–14 mm long, narrowly lanceoid, bony, stramineous, the acute apex bearing a bristle connecting to the stigma, the lateral walls 0.2 mm thick, within with circular striations, shining; seed 10 mm long, ellipsoid; apical mesocarp 9–10 mm long, of a firm tissue of parenchyma and fibers; basal mesocarp 7–8 mm long, fibrous and fleshy.

EXPANDED DESCRIPTION: Tree 5–10 m tall, 30–45 cm in diameter; bark gray, dimpled; prop roots to 2 m long; leaf blades at outer $\frac{2}{3}$ point 44–75 mm wide; innermost bracts next to the syncarp 12 cm long, 8 cm wide, green; stigma dark brown, the rest of the drupe white.

HOLOTYPE: "Solomon Islands: Ysabel Island, Garona, *Brass* 3,375 (TYPE), December 22, 1932, common in swampy lowland rain-forests." (A). Holotype examined. Isotype (L).

SPECIMENS EXAMINED: Solomon Islands, SE New Georgia, Tombe, ridge top, well drained primary forest, 60 ft alt, June 28, 1954, nom. vern. "ahehole," *L. Maenu'u* BSIP 6,080 (L); New Georgia Group, Rendova I., Ugeli, near Buruku, in lowland forest of *Vitex*, *Wormia*, *Eugenia*, *Campnosperma*, on slopes in shade of primaeval rainforest, in well drained soil, 24 Nov. 1957, *B. C. Stone* 2,557 (BISH).

***Pandanus alatus* sp. nov. (sect. *Pandanus*)**

Figs. 323, 324

DIAGNOSIS HOLOTYPI: "Arbor 8–10 m alta latiter ramosa, trunco et ramis cum aculeis brevibus crassis horizontalibus, caule cum radicibus fulturosis paucis sed valde crassis," foliis 1.39–1.48 (+0.05–0.1?) m longis proxima basem 5.8 cm latis in medio 4 cm latis coriaceis U-sulcatis 2-plicatis in sectione mediali cum 55 nervis parallelis secundariis in quoque dimidio nervis tertiis transversis evidentis praecipue ad basim et reticulis breviter oblongis vel quadratis formantibus lamina gladiata ex basi in apice gracili longo trigono subulato deminuenti (apice delapso) basi inermi pallida, ex 7–9.5 cm marginibus cum aculeis 2–4 mm longis 3–11 mm separatis subulatis adscendentibus eis inferioribus brevioribus et rectis illis sequentibus subarcuatis stramineis, midnervo infra ex 15 cm cum umbonibus 0.8–1 mm longis 20–35 mm separatis rotundatis subreflexis brunneis, in sectione mediali marginibus cum aculeis 1.3–2 mm longis 3–11 mm separatis arcuatis subulatis valde adscendentibus apicibus subrubris, midnervo infra cum aculeis 1.2–1.7 mm longis 4–8 mm separatis arcuatis subulatis compressis valde adscendentibus stramineis, in apice subulato marginibus inermibus sed midnervo infra cum crenulis 0.2–0.3 mm longis 2–4 mm separatis subrubris, infructescentia cum syncarpio solitario pendenti, pedunculo 16 mm diametro 3-laterato cum bracteis paucis caducis, syncarpio 28 cm longo, 16.5 cm diametro cylindrico obtuso minime 3-laterato cum 84 phalangibus, eis 6.4–6.7 cm longis 3.2–5 cm latis 2.5–

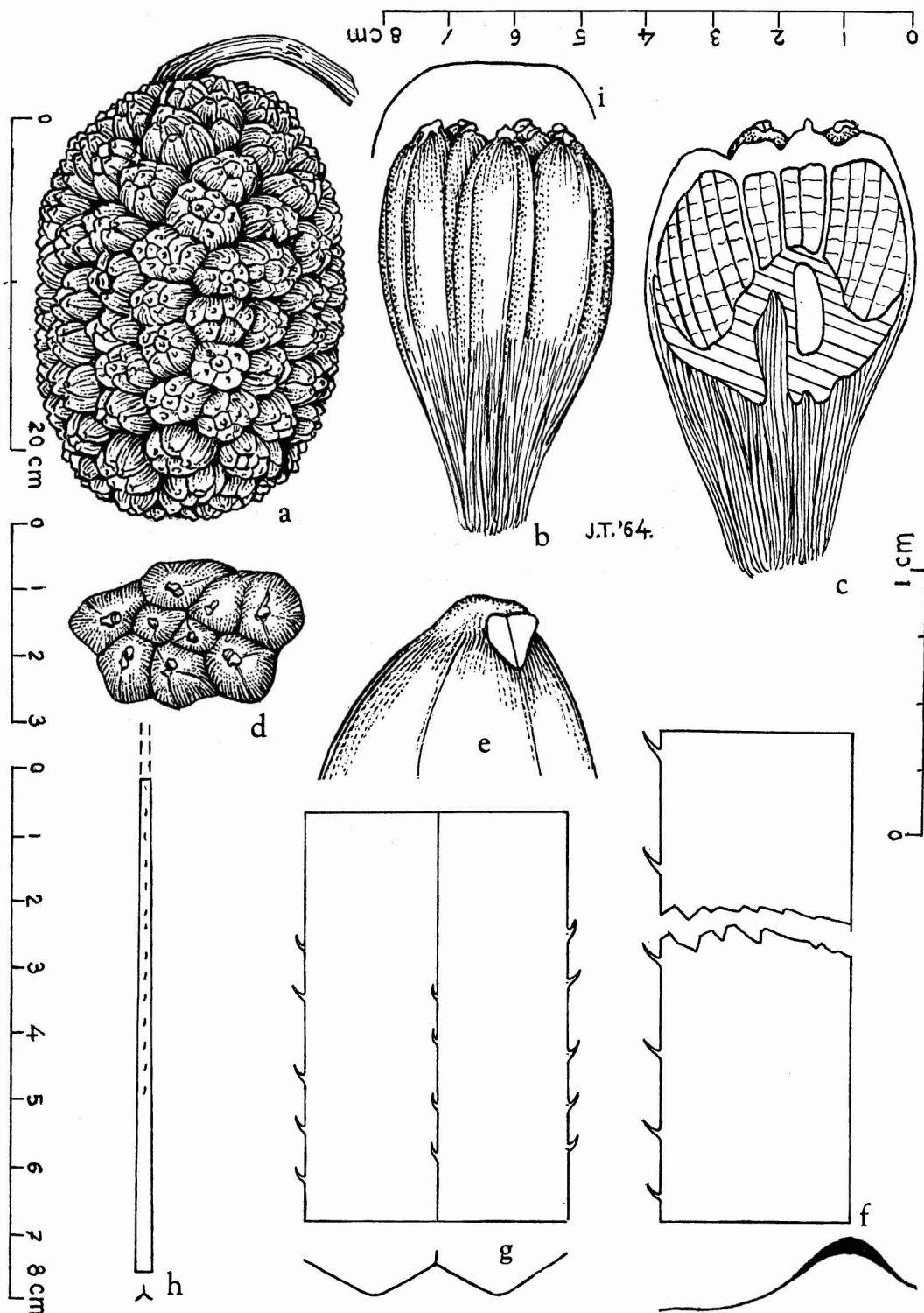


FIG. 323. *Pandanus alatus* St. John, from holotype. *a*, syncarp, $\times \frac{1}{4}$; *b*, phalange, lateral view, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, stigma and carpel apex, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$; *i*, profile of phalange, $\times 1$.



FIG. 324. *Pandanus galeatus* St. John, from holotype, the syncarp at the front; *P. floribundus* Merr. & Perry, the syncarp at the left; *P. luteus* St. John, from holotype, the syncarp at the right. Photo by L. J. Brass.

3–7 cm crassis et plerumque pyriformibus apice truncato 4–6-angulatis, carpelibus marginalibus plerumque cum 1–2 angulis secundariis debilibus parte $\frac{1}{4}$ supera libera lateribus subcurvatis laevibus lucidis, carpelibus 6–14, plerumque 7–9

adscendentibus plerumque parallelis eis marginalibus cum apicibus ovoideis et majoribus omnibus cum plano parvo obliquo distali illis interioribus ovoideis vel lanceoloideis acutis $\frac{1}{3}$ – $\frac{1}{2}$ tam grandibus quam exterioribus sinibus

lateralibus plerumque nullis vel raro uno ad mediam extenso, sinibus apicalibus centralibus 3–6 mm profundis subcurvatis vel rectis V-formatis, sinibus proximalibus $\frac{1}{2}$ – $\frac{2}{3}$ ad fundam extensis, endocarpio in parte $\frac{2}{3}$ supera osseoso brunneo 25 mm longo corpore lati-ellipsoideo sed lateribus inferis cum alis longis curvatis adscendentibus intra lucidis et laevibus supra rugosis, seminibus 12–14 mm longis latiter ellipsoideis, mesocarpio in apice quaeque carpellae cavernam aerenchymatosam cum fibrils longitudinalibus paucis et membranis albis multis, mesocarpio basali 2.5 cm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: "Tree 8–10 m tall, of open branched habit; stem and branches armed with short, stout, horizontal prickles; stem supported on a few very stout prop roots;" leaves 1.39–1.48 (+0.05–0.1?) m long, 5.8 cm wide near the base, 4 cm wide at the middle, coriaceous, U-sulcate, 2-pleated, at midsection with 55 parallel secondary veins in each half, tertiary crossveins visible below and easily so near the base, forming short oblong or square meshes, blade sword-shaped, tapering from the base into the long, slender trigonous subulate apex (the tip of ours lost), base unarmed, pale, beginning at 7–9.5 cm up the margins with prickles 2–4 mm long, 3–11 mm apart, subulate, ascending, the lower shorter ones straight, the next ones subarcuate, stramineous; the midrib below beginning 15 cm up with rounded umbos 0.8–1 mm long, 20–35 mm apart, slightly reflexed, brown; at midsection the margins with prickles 1.3–2 mm long, 3–11 mm apart, arcuate subulate, strongly ascending, the tips reddish; the nearby midrib below with prickles 1.2–1.7 mm long, 4–8 mm apart, arcuate subulate, compressed, strongly ascending, stramineous; near the subulate apex the margins unarmed, the midrib below with crenulations 0.2–0.3 mm long, 2–4 mm apart, reddish; infructescence with a solitary drooping syncarp; peduncle 16 mm in diameter, 3-sided, with a few caducous bracts; syncarp 28 cm long, 16.5 cm in diameter, cylindric with obtuse ends, slightly 3-sided, bearing 84 phalanges, these 6.4–6.7 cm long, 3.2–5 cm wide, 2.5–3.7 cm thick, pyriform, the apex truncate, 4–6-angled, and mostly the marginal carpels with 1–2 weak secondary

angles, upper $\frac{1}{4}$ free, the sides of gently curving planes, smooth, shining; carpels 6–14, mostly 7–9, ascending, more or less parallel, the marginal ones with apices ovoid and all the large ones with a tiny oblique plane platform distal of the stigma, the inner apices ovoid to lanceoloid, acute, $\frac{1}{3}$ – $\frac{1}{2}$ as large as the outer, lateral sinuses mostly none, rarely one extending down to midsection; central apical sinuses 3–6 mm deep, gently curved or straight, V-shaped; proximal sinuses running $\frac{1}{2}$ – $\frac{2}{3}$ way to valley bottom; endocarp in upper $\frac{2}{3}$, bony, brown, 25 mm long, the body broad ellipsoid, but from the lower sides with ascending marginal wings rising almost to the height of the apex, within shining, and smooth below, roughened above; seeds 12–14 mm long, broadly ellipsoid; mesocarp forming in the apex of each carpel a cavern with aerenchyma of a few longitudinal fibers and many white membranes, the marginal caverns much the larger; basal mesocarp 2.5 cm long, fibrous and fleshy.

HOLOTYPE: Papua, Louisiade Archipelago, Sudest I., Joe Landing, common on open inner edges of the mangroves, Aug. 18, 1956, L. J. Brass 27,735 (L). Isotypes (A, US)!

DISCUSSION: *P. alatus* is a member of the section *Pandanus*, as is its closest relative, *P. glaucus* St. John, of Menapi, Cape Vogel Peninsula, Papua, a species with the syncarp subglobose, 20 cm long, 18 cm in diameter; phalanges 5.6–6.1 cm long, 2.7–3.7 cm wide, the upper $\frac{1}{3}$ free, the apex convex; carpels 6–8, their apices subequal, oblate conic; central apical sinuses 2–3 mm deep; endocarp with short lateral shoulders from the upper margins; and the leaves with 71 parallel secondary veins in each half, the midrib below unarmed almost to the middle. *P. alatus* has the syncarp cylindric, 28 cm long, 16.5 cm in diameter; phalanges 6.4–6.7 cm long, 3.2–5 cm wide, upper $\frac{1}{4}$ free, the apex truncate; carpels 6–14, the apices of the central ones $\frac{1}{3}$ – $\frac{1}{2}$ as large as those of the marginal ones which have a tiny plane oblique platform distal of the stigma; central apical sinuses 3–6 mm deep; endocarp with slender lateral wings ascending from the lower sides; and leaves with 55 parallel secondary veins in each half, the midrib beginning at 15 cm up with

rounded umbos 0.8–1 mm long, 20–35 mm apart, slightly reflexed, brown.

The new epithet is the Latin adjective *alatus*, winged, and is given with reference to the lateral ascending wings of the endocarp.

***Pandanus marinus* sp. nov. (sect. *Pandanus*)**

Fig. 325

NOM. VERN. “taulu” (Wapi language, Pultahul).

DIAGNOSIS HOLOTYPE: Arbor 10 m alta ramosa, radicibus fulturosis 40 cm longis, foliis 1.43 (+0.10–0.12 ?) m longis proxima basem 5.3 cm latis in medio 4.5 cm latis coriaceis supra obscure viridibus infra palliditer viridibus U-sulcatis 2-plicatis in sectione mediali cum 49 nervis parallelis secundariis in quoque dimidio nervis tertiis transversis in paginis ambis evidentis et reticulis anguste oblongis formantibus, lamina gladiata et ex basi in apice subtili (sed apice ultimo perduto) deminuenti, basi inermi brunnea sed ex 4.5–5 cm marginibus cum aculeis 2–3 mm longis 4–12 mm separatis subrectis subulatis adscendentibus pallidis, midnervo proximo infra inermi, in sectione mediali marginibus cum aculeis 2 mm longis 28–70 mm separatis arcuatis subulatis compressis adpresse adscendentibus apicibus brunneis, midnervo proximo infra cum aculeis simulantibus sed gracilioribus, in regione apicali marginibus inermibus sed midnervo infra cum aculeis crassis obtusis 0.2–0.3 mm longis adpresse adscendentibus brunneis, syncarpio incognito, phalangibus 5.6–5.8 cm longis 3.2–3.7 cm latis 2.9–3.4 cm crassis pyriformibus 5–6-angulatis subcompressis parte $\frac{1}{2}$ supera libera lateribus subconvexis laevibus lucidis, apice convexo, sinibus centralibus apicalibus 3–4.5 mm profundis subrectis parte $\frac{1}{3}$ infera anguste V-formata parte supera salienti, sinibus lateralibus angustis sed in parte supera distinctis, carpelis 12–15 apicibus oblatis-semiorbicularibus angulatis eis interioribus $\frac{2}{3}$ tam grandibus quam exterioribus, stigmatibus 1–1.5 mm longis obovatis vel ellipticis centripetalibus brunneis papillosis in apice proximali affixis et valde obliquis, sinibus proximalibus $\frac{1}{4}$ – $\frac{2}{3}$ ad fondam extentis, endocarpio in parte $\frac{1}{3}$ supera osseoso stramineo cum projectionibus lanceoloideis supra semines omnes lateribus

lateralibus 2–3 mm crassis intra sublaevibus lucidis obscure brunneis, seminibus 8–10 mm longis ellipsoideis, mesocarpio in apice carpelae quaeque cavernam cum membranis transversis brunneis paucis formanti, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 10 m tall, branched several times; prop roots 40 cm long; leaves 1.43 (+0.10–0.12 ?) m long, 5.3 cm wide near the base, 4.5 cm wide at the middle, coriaceous, above dark green, below pale green, U-sulcate, 2-pleated, at midsection with 49 parallel secondary veins in each half, the tertiary cross-veins evident on both sides, forming narrow oblong meshes, blade sword-shaped, tapering from near the base into the slender apex (but the tip lost in ours), base unarmed, brownish, beginning at 4.5–5 cm up the margins with prickles 2–3 mm long, 4–12 mm apart, almost straight subulate, ascending, pale; near the base, the midrib below unarmed; at midsection the margins with prickles 2 mm long, 28–70 mm apart, arcuate subulate, compressed, appressed ascending, brown tipped; the nearby midrib below with similar prickles, but these slightly more slender; near the apex the margins unarmed, but the midrib below with thick, blunt prickles 0.2–0.3 mm long, appressed ascending, brown; syncarp unknown; phalanges 5.6–5.8 cm long, 3.2–3.7 cm wide, 2.9–3.4 cm thick, pyriform, 5–6-angled, slightly compressed, upper $\frac{1}{2}$ free, the sides gently convex, smooth, shining, the apex convex, central apical sinuses 3–4.5 mm deep, nearly straight, the lower $\frac{1}{3}$ narrow V-shaped, the upper part wide flaring, the lateral sinuses narrow but distinct in upper half; carpels 12–15, the apices oblate semiorbicular, angled, the inner ones $\frac{2}{3}$ as large as the outer; stigmas 1–1.5 mm long, obovate to elliptic, centripetal, brown, papillose, on the proximal crest and strongly oblique; proximal sinus running $\frac{1}{4}$ – $\frac{2}{3}$ way to valley bottom; endocarp in upper $\frac{1}{3}$, bony, stramineous, with several small lanceoloid projections over each seed, lateral walls 2–3 mm thick, within nearly smooth, shining, dark brown; seeds 8–10 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern with a few brown transverse membranes; basal mesocarp fibrous and fleshy.

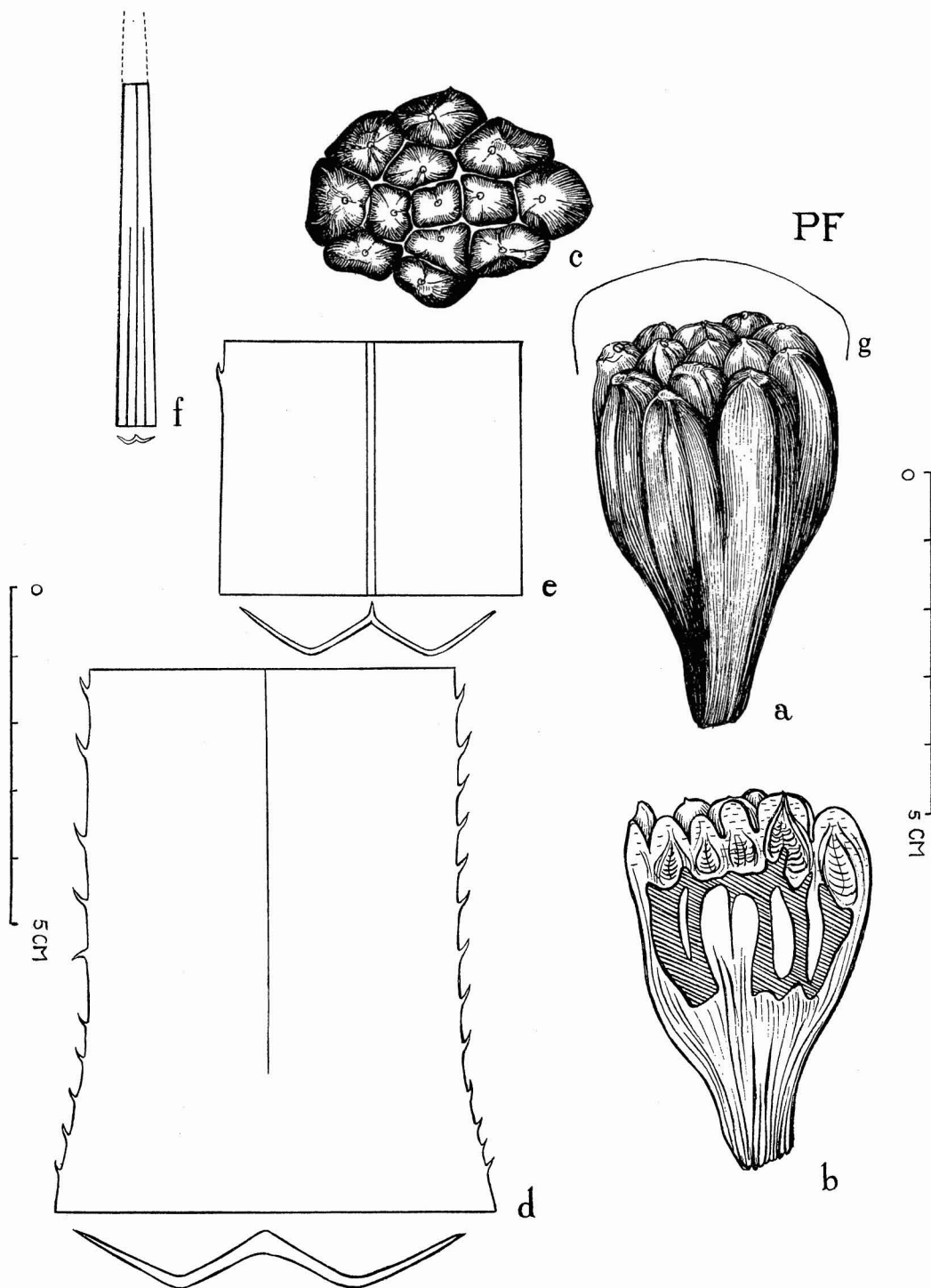


FIG. 325. *Pandanus marinus* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, leaf base, lower side, $\times 1$; *e*, leaf middle, lower side, $\times 1$; *f*, leaf apex, lower side, $\times 1$; *g*, profile of phalange, $\times 1$.

HOLOTYPE: New Guinea, Sepik Dist., Aitape Subdist., near Yakoi village (ca. 1 mile w. of Aitape), common behind sandy beach, 10 ft alt, also inland in *Imperata* grassland behind coconut plantation, 3 June 1961, P. J. Darbyshire & R. D. Hoogland 7,859 (BM). Isotypes (BISH, G, L)!

DISCUSSION: *P. marinus* is a member of the section *Pandanus*, and there is found its closest relative, an undescribed species from Koembe, in southern Irian Barat, represented by St. John 26,150, and a plant with the phalanges 4.3 cm wide, their sides ridged and furrowed; carpels 7–8, their apices pyramidal, subequal; central apical sinuses 2–4 mm deep; stigmas 2–2.5 mm long; and the leaves 4.5 cm wide. *P. marinus* has the phalanges 3.2–3.7 cm wide, the sides gently convex; carpels 12–15, their apices oblate semi-orbicular, angled, the inner ones $\frac{2}{3}$ as large as the outer; central apical sinuses 3–4.5 mm deep; stigmas 1–1.5 mm long; and the leaves 5.3 cm wide.

The new epithet is the Latin adjective *marinus*, maritime, and is given with reference to the habitat of the species.

***Pandanus vogelensis* sp. nov. (sect. *Pandanus*)**

Fig. 326

DIAGNOSIS HOLOTYPE: Arbor 6–10 m alta, trunco et ramis cum aculeis crassis, radicibus fulurosus brevibus crassis, corona multiramosa, foliis 1.51 m longis proxima basem 6.5 cm latis in medio 4.8 cm latis coriaceis supra obscure viridibus glaucis infra palliditer viridibus glaucis U-sulcatis 2-plicatis in sectione mediali cum 71 nervis parallelis secundariis in quoque dimidio nervis tertiis ad basim infra notatis et reticulis breviter oblongis formantibus, lamina gladiata ex basi in apice longo gracili trigono subulato deminuenti eo in puncto 10 cm ex apice 1 mm lato basi inermi pallida, ex 6 cm marginibus cum aculeis 2–2.5 mm longis 4–7 mm separatis subarcuatis crassiter subulatis adscendentibus stramineis, midnervo infra paene ad medium inermi, in sectione mediali marginibus cum aculeis 1–1.3 mm longis 3–7 mm separatis crassiter subulatis adpresse adscendentibus apicibus rubris, midnervo infra cum aculeis 0.8–1.2 mm longis 5–10 mm separatis subulatis adpresse adscen-

dentibus apicibus rubris, in apice subulato marginibus inermibus sed midnervo infra cum aculeis 0.3–0.4 mm longis 3–5 mm separatis valde arcuatis subulatis adpresse adscendentibus apicibus rubris, syncarpio solitario 20 cm longo 18 cm diametro subgloboso viridi obscure trigono, phalangibus 5.6–6.1 cm longis 2.7–3.7 cm latis 2.3–3 cm crassis pyriformibus 5-angulatis parte $\frac{1}{3}$ supra libera sinibus lateralibus nullis, lateribus superis subconvexis laevibus lucidis apice convexo sinibus centralibus apicalibus 2–3 mm profundis rectis vel subcurvatis late V-formatis, carpelis 6–8 apicibus oblate conicis subaequalibus, stigmatibus 1.3–2 mm longis late ellipticis vel subcircularibus horizontalibus exelevatis pallide brunneis papillosis sulcatis centripetalibus, endocarpio in parte $\frac{2}{3}$ supra osseoso pallido subpyramidaliter lateribus lateralibus 4–5 mm crassis intra brunneis laevibus lucidis, seminibus 13–15 mm longis ellipsoideis, mesocarpio in apice quaque carpelae cavernam cum fibris paucis et membranis pallidis, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 6–10 m tall; trunk and branches armed with stout prickles; prop roots short, thick; crown well branched; leaves 1.51 m long, 6.5 cm wide near the base, 4.8 cm wide at the middle, coriaceous, dark green above, pale green below, glaucous on both sides, U-sulcate, 2-pleated, at midsection with 71 parallel secondary veins in each half, the tertiary crossveins seen below towards the base, forming short oblong meshes, the blade sword-shaped, tapering from the base into the long, slender subulate, trigonous apex, this at the point 10 cm down 1 mm wide, the base unarmed, pale; beginning at 6 cm up the margins with prickles 2–2.5 mm long, 4–7 mm apart, subarcuate, stout subulate, ascending, stramineous; the midrib below unarmed almost to the middle; at midsection the margins with prickles 1–1.3 mm long, 3–7 mm apart, stout subulate, appressed ascending, red-tipped; the nearby midrib below with prickles 0.8–1.2 mm long, 5–10 mm apart, subulate, appressed ascending, red-tipped; on the subulate apex the margins unarmed, but the midrib below with prickles 0.3–0.4 mm long, 3–5 mm apart, strongly arcuate subulate, appressed ascending, red-tipped; infructescence with a solitary green

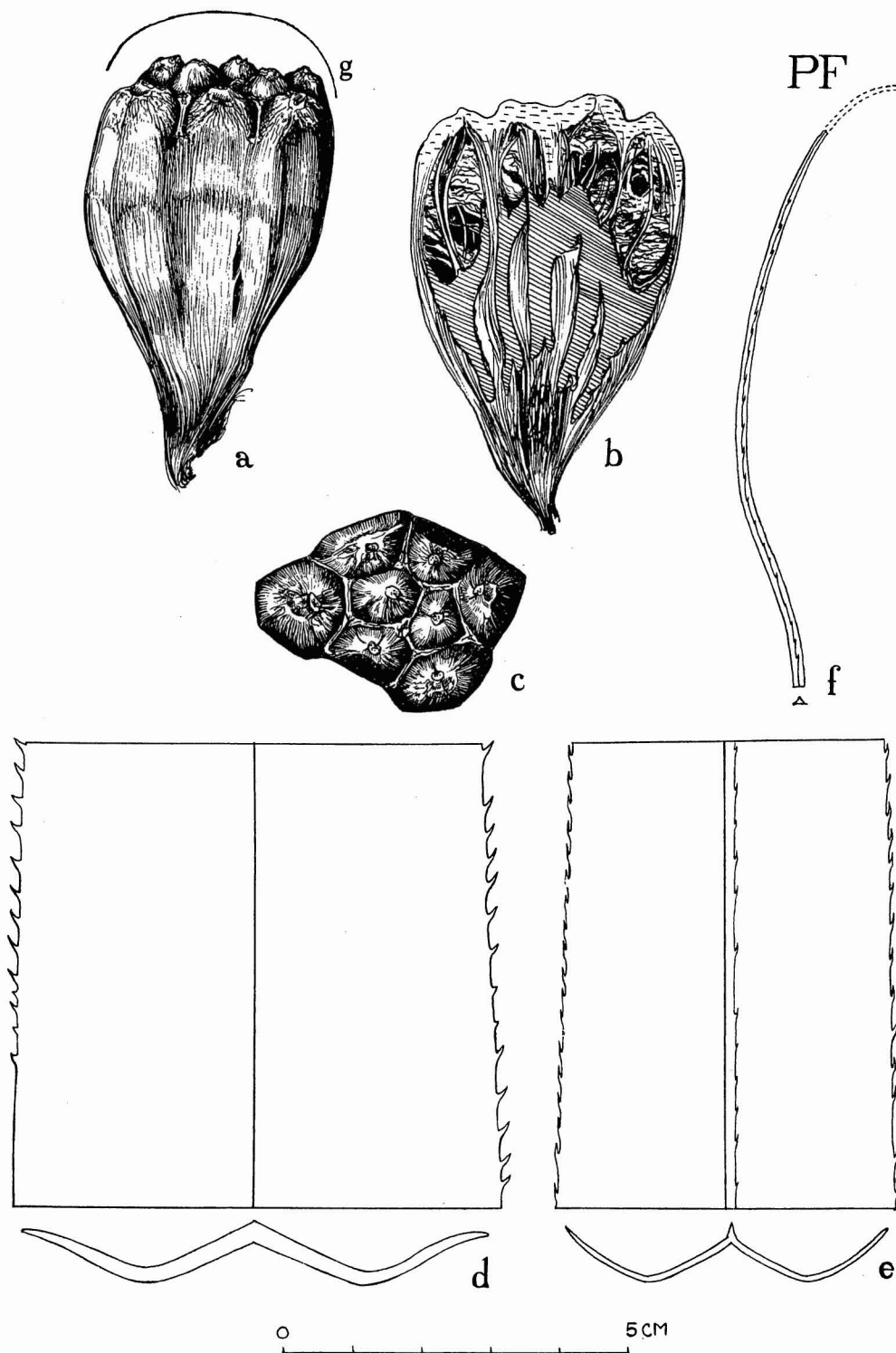


FIG. 326. *Pandanus vogelensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, leaf base, lower side, $\times 1$; *e*, leaf middle, lower side, $\times 1$; *f*, leaf apex, lower side, $\times 1$; *g*, profile of phalange, $\times 1$.

syncarp, this 20 cm long, 18 cm in diameter, subglobose, very obscurely 3-angled; phalanges 5.6–6.1 cm long, 2.7–3.7 cm wide, 2.3–3 cm thick, pyriform, 5-angled, upper $\frac{1}{3}$ free, lateral sinuses none; the upper sides gently convex, smooth, shining; phalange apex convex; central apical sinuses 2–3 mm deep, straight or gently curved, wide V-shaped; carpels 6–8, their apices oblate conic, subequal; stigmas 1.3–2 mm long, broad elliptic to nearly round, apical, horizontal, flush, pale brown, papillose, centripetal, sulcate; endocarp in upper $\frac{2}{3}$, bony, pale, roughly pyramidal, the lateral walls 4–5 mm thick, within brown, smooth, shining; seeds 13–15 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern with a few fibers and pale membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Papua, Milne Bay Dist., Menapi, Cape Vogel Peninsula, common on old grassy garden lands in rain forest, 2 m alt, 1 April 1953, L. J. Brass 21,778 (K).

SPECIMENS EXAMINED: Netherlands New Guinea, Hamade, Hollandia, 100 m van de Zeekust, op rotsige bodem, secundair terrein, zeer algemeen, 5 m alt, Nov. 23, 1956, C. Kalkman (BW) 3,622 (L).

DISCUSSION: *P. vogelensis* is a member of the section *Pandanus*, as is its closest relative, *P.*

odoratissimus L. f. var. *novi-caledonicus* (Martelli) St. John which has the syncarp about 10 cm in diameter; phalanges 5.2–5.5 cm long, 3.5–4 cm wide; carpel apices oblate hemispheric and some of them angled; endocarp 21 mm long, the upper lateral edge acute; leaves 7.3 cm wide near the base, and at midsection with 59 parallel secondary veins in each half, and there the margins with prickles 1.8–2.3 mm long, 4–6 mm apart, arcuate thick subulate, compressed, appressed ascending and partly countersunk, dark red nearly throughout. *P. vogelensis* has the syncarp 18 cm in diameter; phalanges 5.6–6.1 cm long, 2.7–3.7 cm wide; carpel apices oblate conic; endocarp 32 mm long, the upper lateral edges with curved winglike shoulders; leaves 6.5 cm wide near the base, and at midsection with 71 parallel secondary veins in each half, and there the margins with prickles 1–1.3 mm long, 3–7 mm apart, stout subulate, appressed ascending, red-tipped.

The new epithet is formed from the name of the type locality, Cape Vogel, to which is added the Latin adjectival, geographic place ending.

LITERATURE CITED

- WARBURG, O. 1900. Pandanaceae, pp. 1–99. In: Adolph Engler [ed.] Das Pflanzenreich Regni vegetabilis conspectus, ser. IV, vol. 9. Wilhelm Engelmann, Leipzig.

NOTE: There has been an error in the consecutive pagination of this revision, beginning in *Pacific Science*, 1965, vol. 19(2): 224. The first page of the work in that issue should be numbered 355 instead of 354. Hence all subsequent folios through 1969, vol. 23(3): 366, should be one number higher.